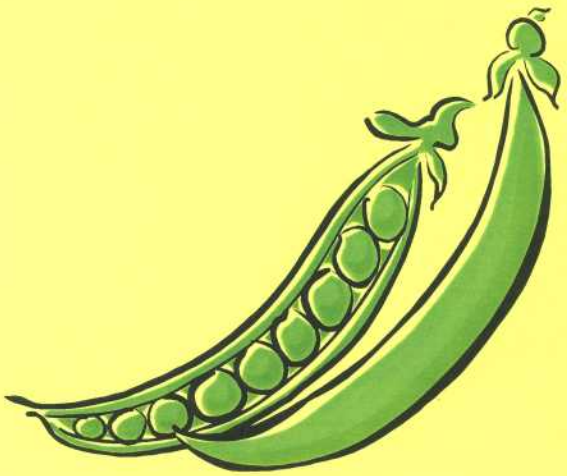
UNIVERSITY OF DELAWARE

Processing Pea Variety Trial Results



2003

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Table of Contents

2003 University of Delaware Pea Variety Trial

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The 2003 Pea Variety Trial was planted at the University of Delaware Research & Education Center, Georgetown, Delaware. The purpose of the trial is to evaluate and identify varieties best adapted for our production region. Yield, quality, and maturity are important characteristics that can vary between production regions. Similar trials have been planted since 1994, with the exception of 1998 and 2001. This year we were limited to one planting date for the trial. In other years, trials were planted on two planting dates, to evaluate early maturing varieties in early season conditions, and later maturing varieties in warmer, late season conditions. Growers and processors generally use early maturing varieties in the early part of the planting season, and longer maturing varieties on later plantings. Later plantings are exposed to warmer conditions, thus generating quicker accumulatio0ns of heat units, facilitating the use of varieities with higher heat unit requirements.

Materials and Methods

The trial was planted on April 4, 2003. Phosphorus and potassium was applied according to soil test. The field was chiseled and field cultivated in late March to prepare seed bed. On April 3, 0-0-60 was applied at 150 lbs./A (90 lbs. P_2O_5/A), broadcast and the field was disked. Pursuit herbicide was applied at 3 ounces/A, pre-plant incorporated with 30% UAN at 18.5 gallons/A (60 lbs. N/A) on April 3. The field was worked using a field cultivator to incorporate the herbicide and nitrogen as well as prepare the seedbed. Twenty-three varieties were planted using an Almaco drill with 9 rows, spaced 8 inches apart. Eight seeds per foot of row were planted of each variety. Final stand counts are reported in the results. Plots were 6' x 50' in size using a randomized block design with 3 replications. The trial was irrigated with a linear overhead sprinkler system. One to 1.5 inches of water was applied per week, as needed.

Harvest Procedure:

Each variety was harvested as near to a tenderometer reading of 100 as possible. Pre-harvest samples were taken 2-3 days prior to reaching this maturity level whenever possible. All three replicates were harvested for each variety on the same day.

Plants were pulled from a 25 foot section. Vines were weighed and fed into a stationary FMC combine. Shelled peas were collected and washed (removing leaves, stones, and other trash). The clean, shelled peas were weighed. A sub-sample was put through a size separator that segregated peas with a diameter of 12/32 inch or greater (#4 sieve size); between 11/32 and 12/32 inch (#3 sieve size); between 9/32 and 11/32 inch (#1&2 sieve size); and peas smaller than 9/32 inch (trash). Three tenderometer readings were taken from each sample. The average is reported.

Ten plants were taken from each variety on the day of harvest and the following measurements were taken: vine length (cm), useable pods/node, pods/plant, and pod length. The data reported is the average of ten plants. The number of peas/pod is the average of ten pods.

Weather data and heat unit accumulation for both trials are included in the appendix. The tenderometer was checked and calibrated by Dr. Charles McClurg, University of Maryland.

Results & Discussion

Yield, maturity, size distribution, and plant characteristics are reported in Table 1. **Superior was the highest yield variety when yields were adjusted to a tenderometer reading of 100. 085 2 0652 was the next highest yield variety. The $LSD_{.05}$ reflects the minimum difference in data required to demonstrate a significant difference tht is repeatable 95% of the time.** Varieties are ranked in this table by the highest yield adjusted to a tenderometer reading of 100. Gross yields include small peas on the trash tray (less than 9/32 inch). Net yields have subtracted the percentage of trash. Net yield adjusted to a tenderometer reading of 100 is determined using the procedure and chart developed by Pumphrey et. al., (Table 5). Adjusting the yield to a common maturity is important when making yield comparisons. The inverse relationship between yield and quality is well-known with peas. Therefore, it is important to consider maturity as indicated by the tenderometer reading, and size distribution when evaluating the data in these tables. Tenderometer readings increase with maturity, as does yield.
Size distribution data reflect not only patterns of maturity, but also the basic size characteristics of a variety. Certain varieties have an inherently smaller sieve size than others, e.g. petit peas are smaller than standard peas. There are also gradations between the petit peas and standard size peas.

Average stand counts are reported in Tables 4. Plants per yard ranged from 17 to 25. There were statistically different populations in the both trials, which should be taken into consideration when comparing yield data between varieties.

The size distribution data in the sieve size columns reveal whether the variety produces predominately large or small peas. This is important as processors determine the possible utilization of a variety.

Heat unit data, when coupled with the tenderometer readings, indicate the relative maturity for each variety. In general, predicted heat units as reported by the seed company are close to the actual heat units. The progression of maturity as reflected by pre-harvest sampling and final harvest tenderometer readings are reported in Tables 2. Please note in the weather data the cool, wet season experienced in 2003.

We hope you find this data informative and useful. If you have questions, please feel free to contact us.

Table 2. Tenderometer Readings for the 2003 University of Delaware Pea Variety Trial

Days after Planting:		66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
Date:		09-Jun	10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun	17-Jun	18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun	24-Jun	25-Jun
Actual Heat Units:		1137.5	1168.5	1205	1243	1281	1321	1353	1377	1397.5	1425	1456	1484.5	1511	1537.5	1572.5	1611	1649.5
Trt.	Variety	Suggested Heat Units																
1	91019-4-1	1475							88		89	**100**						
2	E.F. 680	1200	86		86	90	99/**103**											
3	9101839	1475							86		96	**102**						
4	CMG 378 F	1590											90		108/**109**			
5	13046	1250			87		103/**110**											
6	Northwind	1180	84		89	91	108/**114**											
7	PLS-19	1175	91		99	**118**												
8	Bolero	1450							82		95	**96**						
9	PLS-135*	1400									<82				101	**112**		
10	087 9 0478	1500									97	**105**						
11	PLS-116	1380							89		92	107/**100**						
12	FR 348	1380							114	107/**113**								
13	CMG 384 AF*	1435							90		100/**101**							
14	PLS-209	1220			83		98/**105**											
15	085 2 0652	1600													<82		89	**92**
16	FR 760	1560									87	95	90		**114**			
17	Galena	1350							90		94/**105**							
18	FR 689	1520									89	93	89		**105**			
19	CMG 340 F	1600													<82		93	**104**
20	FR 630	1440							85		97	**108**						
21	Survivor*	1600											<82		87	91	**103**	
22	Jumpstart	1140	98	**102**														
23	Estancia*	1450							93	96	**100**							

* Afila Types

T-Readings: Regular print is the t-reading for pre-harvest sampling. **Bold print is the average t-reading at harvest for three replications.**

Table 1. Yield, Maturity, Size Distribution and Plant Characteristics of the 2003 University of Delaware Pea Variety Trial.

Variety	Harv. Date	DAP	Suggested Heat Units	Actual Units	Average				Size				Vine Wt./ Plot (lbs)	Average of 10 Plants				Avg. of 10 Pods	Seeds/ lbs	Seed Source
					Tender-ometer	Gross Yields lbs/A	Net Yield lbs/A	Net Yield Adj. To 100 T lbs/A	% Trash ≤ 9/32	% 1&2's 9/32 & 10/32	% 3's 11/32	% 4's 12/32 & ≥		Vine Length (cm)	Pods/ Node	Pods/ Plant	Pod Length (cm)	Peas/Pod		
Survivor*	24-Jun	81	1600	1611	103	4733	4672	4501	1	8	31	60	93	46.7	1.7	4.8	7.7	6.2	2725	Seminis
085 2 0652	25-Jun	82	1600	1650	92	3616	3486	4183	4	24	41	32	96	57.7	1.6	4.3	7.5	5.4	2400	Seminis
FR 689	22-Jun	79	1520	1538	105	4051	4002	3768	1	20	35	43	94	66.3	1.6	4.5	8.4	6.8	2554	Brotherton
CMG 340 F	25-Jun	82	1600	1650	104	4003	3938	3755	2	12	33	53	85	57.2	1.7	4.1	8.6	7	2508	Crites-Moscow
FR 760	22-Jun	79	1560	1538	114	4245	4245	3584	0	8	25	67	96	59.7	1.7	3.9	8.4	6.5	2432	Brotherton
Bolero	19-Jun	76	1450	1456	96	3238	3015	3482	7	22	27	44	108	56.6	1.6	5.5	6.6	5.7	2360	Seminis
087 9 0478	19-Jun	76	1500	1456	105	3611	3383	3374	6	18	26	50	103	47.0	1.7	5.0	6.6	6.4	2243	Seminis
CMG 378 F	22-Jun	79	1590	1538	109	3804	3766	3340	1	18	44	37	97	53.1	1.4	4.2	8.0	7.2	2123	Crites-Moscow
FR 348	17-Jun	74	1380	1398	113	3886	3835	3329	1	16	34	49	74	50.4	1.3	4.4	6.6	5.4	2288	Brotherton
E.F. 680	13-Jun	70	1200	1281	103	3495	3414	3298	2	12	26	59	61	41.3	1.1	3.2	5.7	4.7	2000	Syngenta
FR 630	19-Jun	76	1440	1456	108	3427	3358	3085	2	14	32	52	89	50.0	1.6	4.3	6.5	5.8	2640	Brotherton
PLS-135*	23-Jun	80	1400	1573	112	3480	3257	3019	6	24	37	33	88	58.7	1.8	5.2	8.0	6.6	2225	Pure Line
19-Sep	13-Jun	70	1250	1281	110	2923	2842	2627	3	14	32	52	61	46.9	1.4	3.5	6.7	4.1	2110	Upper Valley Seed
CMG 384 AF*	18-Jun	75	1435	1425	101	2642	2374	2592	10	26	36	27	89	63.5	1.8	5.0	7.6	5.6	2313	Crites-Moscow
91019-4-1	19-Jun	76	1475	1456	100	2522	2361	2506	6	34	36	23	112	60.3	2.3	6.4	6.3	6.4	1920	Upper Valley Seed
PLS-209	13-Jun	70	1220	1281	105	2551	2465	2381	3	17	29	51	69	57.4	1.3	4.6	6.4	4	2390	Pure Line
9101839	19-Jun	76	1475	1456	102	2444	2162	2373	12	34	38	17	113	55.6	1.8	6.5	6.7	6.9	1965	Upper Valley Seed
PLS-19	12-Jun	69	1175	1243	118	2773	2727	2291	2	17	29	52	56	47.2	1.0	3.4	6.7	5.9	2160	Pure Line
Northwind	13-Jun	70	1180	1281	114	2619	2592	2200	1	11	40	48	60	48.0	1.6	4.7	6.4	4.4	2150	Syngenta
Estancia*	18-Jun	75	1450	1425	100	2188	1986	2188	9	43	38	10	97	59.4	1.6	4.1	5.7	3.5	3089	Seminis
Jumpstart	10-Jun	67	1140	1169	103	2222	2005	2126	10	51	35	5	56	39.0	1.1	2.4	6.2	4.9	3048	Brotherton
PLS-116	19-Jun	76	1380	1456	100	2052	1988	2053	3	19	34	44	103	57.2	1.4	6.5	7.7	6.5	2270	Pure Line
Galena	18-Jun	75	1350	1425	105	2125	2065	1973	17	13	23	62	100	70.2	1.7	5.4	10.6	6.8	2500	Syngenta
LSD $_{0.05}$					7	713	711	608	3	7	7	10	16							

*Afila Types

Table 3. First Flower, Full Flower, and First Flowering Node Data for the 2003 University of Delaware Early Pea Variety Trial.

Variety	Date of First Flower	Date of Full Flower	First Flowering Node
91019-4-1	5/30/03	6/6/03	13
E.F. 680	5/15/03	5/25/03	8
9101839	5/30/03	6/6/03	12
CMG 378 F	5/30/03	6/8/03	13
13046	5/19/03	5/25/03	9
Northwind	5/14/03	5/24/03	9
PLS-19	5/14/03	5/25/03	9
Bolero	5/30/03	6/8/03	11
PLS-135	6/2/03	6/10/03	14
087 9 0478	5/30/03	6/6/03	12
PLS-116	5/25/03	6/5/03	11
FR 348	5/24/03	6/2/03	10
CMG 384 AF	5/28/03	6/3/03	11
PLS-209	5/15/03	5/24/03	10
085 2 0652	6/6/03	6/13/03	13
FR 760	5/30/03	6/5/03	12
Galena	5/24/03	6/3/03	11
FR 689	5/30/03	6/6/03	11
CMG 340 F	6/3/03	6/12/03	12
FR 630	5/25/03	6/2/03	11
Survivor	6/2/03	6/10/03	14
Jumpstart	5/14/03	5/21/03	10
Estancia	5/30/03	6/3/03	14

Table 4. Average Stand Count Data of the 2003 University of Delaware Pea Variety Trial.
(Average number of plants per 3 foot of row; 2 locations/plot/rep)

Variety	Average
Estancia	25
Survivor	25
Jumpstart	24
FR 630	22
CMG 348AF	22
PLS-209	22
PLS-135	21
FR 348	21
FR 760	21
CMG 378 F	21
FR 689	20
Northwind	20
PLS-19	20
E.F. 680	20
PLS-116	19
Galena	19
Bolero	19
087 9 0478	19
13046	19
CMG 340 F	18
085 2 0652	18
91019-4-1	17
9101839	17
$LSD_{0.05}$	3.5

Table 5. T-Reading Adjustment Using Pumphery et.al. Systems*

Actual T Reading	Adj. Factor
150	130.0
145	130.4
140	130.6
135	130.0
130	128.6
129	128.3
128	127.4
127	127.5
126	126.9
125	126.5
124	125.8
123	125.2
122	124.6
121	123.9
120	123.2
119	122.5
118	121.7
117	120.9
116	120.0
115	119.1
114	118.2
113	117.2
112	116.2
111	115.1
110	113.9
109	112.8
108	111.7
107	110.4
106	109.1
105	107.8
104	106.4
103	105.0
102	103.5
101	102.0
100	100.0
99	98.8
98	97.1
97	95.4
96	93.6
95	91.8
94	89.9
93	88.0
92	86.0
91	83.9
90	81.9

* Pumphery, F.V., Ramig, R.E., Allmoras, R.R., "Yield Tenderness Relationships in 'Dark Skinned Perfection' Peas". J. Amer. Soc. Hort. Sci. 100(5): 507-509. 1975.

Heat Unit Accumulation for the 2003 University of Delaware Processing Pea Variety Trials

(40 degree base)

Date	High	Low	Heat Units	Pea Variety
05/16/2002	60	50	15	647
05/17/2002	51	48	9.5	656.5
05/18/2002	54	46	10	666.5
05/19/2002	67	43	15	681.5
05/20/2002	74	40	17	698.5
05/21/2002	71	53	22	720.5
05/22/2002	57	55	16	736.5
05/23/2002	56	52	14	750.5
05/24/2002	65	53	19	769.5
05/25/2002	64	53	18.5	788
05/26/2002	63	53	18	806
05/27/2002	63	56	19.5	825.5
05/28/2002	67	49	18	843.5
05/29/2002	72	53	22.5	866
05/30/2002	78	56	27	893
05/31/2002	75	61	28	921
06/01/2002	64	56	20	941
06/02/2002	70	49	19.5	960.5
06/03/2002	70	53	21.5	982
06/04/2002	72	59	25.5	1007.5
06/05/2002	75	58	26.5	1034
06/06/2002	77	54	25.5	1059.5
06/07/2002	74	59	26.5	1086
06/08/2002	68	58	23	1109
06/09/2002	79	58	28.5	1137.5
06/10/2002	80	62	31	1168.5
06/11/2002	87	66	36.5	1205
06/12/2002	88	68	38	1243
06/13/2002	85	71	38	1281
06/14/2002	88	72	40	1321
06/15/2002	78	66	32	1353
06/16/2002	69	59	24	1377
06/17/2002	64	57	20.5	1397.5
06/18/2002	75	60	27.5	1425
06/19/2002	75	67	31	1456
06/20/2002	74	63	28.5	1484.5
06/21/2002	74	59	26.5	1511
06/22/2002	73	60	26.5	1537.5
06/23/2002	89	61	35	1572.5
06/24/2002	92	65	38.5	1611
06/25/2002	93	64	38.5	**1649.5**

UNIVERSITY OF DELAWARE

College of Agriculture and Natural Resources

April 2003

2003	Julian Date	Maximum Temperature F	Minimum Tempature F	Rainfall Inches	Maximum Soil Temperature	Minimum Soil Temperature
1-Apr	91	57.70	27.50	0.00	52.32	36.48
2	92	76.75	45.70	0.00	66.97	43.89
3	93	62.15	43.86	0.00	66.94	49.23
4	94	49.35	42.85	0.00	53.78	47.91
5	95	63.66	43.04	0.01	58.93	47.50
6	96	54.99	38.44	0.00	62.51	42.75
7	97	42.80	38.58	0.58	47.52	43.40
8	98	40.49	38.08	0.01	45.64	42.67
9	99	42.80	38.23	0.94	45.18	41.31
10	100	42.61	38.82	0.25	46.22	41.82
11	101	46.94	41.32	0.73	47.91	41.83
12	102	66.97	44.27	0.35	57.40	45.50
13	103	62.51	41.72	0.00	62.06	43.12
14	104	66.33	34.86	0.00	68.72	41.78
15	105	75.47	46.00	0.00	70.72	46.65
16	106	83.48	58.78	0.00	74.88	55.18
17	107	69.76	39.00	0.00	60.44	46.47
18	108	46.08	39.69	0.09	50.32	45.61
19	109	57.87	42.34	0.00	62.94	46.90
20	110	61.70	37.91	0.00	66.65	44.11
21	111	68.04	39.54	0.00	69.78	47.44
22	112	71.22	53.11	0.00	67.89	54.91
23	113	61.03	43.23	0.00	62.87	48.38
24	114	63.68	34.72	0.00	64.18	43.91
25	115	71.04	44.85	0.21	65.88	48.88
26	116	61.43	53.64	0.07	60.66	55.15
27	117	71.02	48.31	0.03	69.69	53.62
28	118	75.85	40.73	0.00	73.51	48.51
29	119	82.98	55.35	0.00	72.73	56.01
30	120	67.21	49.57	0.00	74.05	54.14
Average		62.13	42.80		61.64	46.84
Total				3.27		
Total				12.94		

Data Collected Midnight- Midnight
Http://www.rec.udel.edu

College of Agriculture and Natural Resources

May 2003

2003	Julian Date	Maximum Temperature F	Minimum Tempature F	Rainfall Inches	Maximum Soil Temperature	Minimum Soil Temperature
1-May	121	80.64	51.78	0.00	75.74	55.83
2	122	76.28	60.46	0.00	73.87	60.40
3	123	64.58	42.90	0.00	64.60	53.78
4	124	60.53	39.14	0.00	69.48	52.00
5	125	55.65	33.13	0.02	56.88	47.23
6	126	66.07	50.14	0.01	64.26	52.86
7	127	80.29	48.52	0.23	76.37	53.02
8	128	73.45	52.88	0.01	71.82	61.52
9	129	64.40	52.95	0.06	67.87	59.00
10	130	72.25	55.29	0.10	69.76	59.00
11	131	82.54	62.83	0.02	75.83	62.71
12	132	73.56	57.83	0.00	70.45	60.30
13	133	66.04	54.99	0.00	64.29	57.04
14	134	70.14	46.13	0.00	72.52	53.08
15	135	70.66	47.91	0.00	77.25	54.55
16	136	60.24	49.66	2.94	62.80	54.16
17	137	50.83	47.79	0.15	57.22	53.01
18	138	53.76	46.44	0.13	59.45	52.39
19	139	67.05	42.52	0.00	73.11	49.62
20	140	73.63	40.05	0.00	76.33	49.93
21	141	71.10	53.04	0.64	68.97	56.08
22	142	57.20	54.57	0.12	60.55	58.50
23	143	55.53	52.11	0.30	60.42	56.82
24	144	65.07	53.47	0.01	67.77	57.56
25	145	63.52	53.42	0.01	65.07	58.28
26	146	62.56	55.72	0.61	63.93	58.62
27	147	66.97	48.90	0.03	73.65	54.88
28	148	64.17	49.64	0.35	66.88	56.53
29	149	72.01	52.93	0.04	69.67	55.58
30	150	78.39	56.35	0.00	80.62	59.94
31	151	75.16	61.20	0.09	72.95	62.13
Average		67.56	50.80		68.72	56.01
Total				5.87		
Total				18.81		

Data Collected Midnight- Midnight
Http://www.rec.udel.edu

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June 2003

2003	Julian Date	Maximum Temperature F	Minimum Tempature F	Rainfall Inches	Maximum Soil Temperature	Minimum Soil Temperature
1-Jun	152	64.33	55.72	0.03	65.66	58.53
2	153	70.18	49.37	0.00	73.58	54.36
3	154	70.02	53.08	0.06	69.15	57.13
4	155	71.53	59.36	0.37	70.63	61.52
5	156	75.18	58.39	0.01	76.77	62.04
6	157	76.68	53.76	0.00	81.68	59.40
7	158	73.74	58.96	2.54	71.19	63.59
8	159	68.16	58.21	0.00	69.87	64.22
9	160	79.27	58.21	0.01	81.91	62.65
10	161	80.15	61.56	0.00	88.14	65.10
11	162	87.37	65.53	0.20	86.58	67.10
12	163	87.89	68.09	0.03	87.49	70.61
13	164	85.37	70.83	0.19	85.57	72.41
14	165	87.84	71.69	0.00	91.18	72.81
15	166	78.39	66.25	0.00	84.83	72.77
16	167	69.37	59.41	0.00	72.93	65.98
17	168	63.82	57.29	0.18	71.29	63.46
18	169	74.91	60.28	0.04	76.03	64.81
19	170	75.50	66.57	0.71	75.50	65.50
20	171	73.56	62.55	0.29	75.04	67.19
21	172	73.65	59.22	0.03	77.00	65.19
22	173	73.31	60.39	0.03	73.40	65.52
23	174	87.87	61.16	0.00	81.21	65.39
24	175	91.94	65.35	0.00	84.97	68.13
25	176	92.82	63.86	0.00	88.54	68.40
26	177	93.02	69.21	0.00	89.17	72.39
27	178	92.37	70.03	0.00	89.87	74.05
28	179	79.65	66.85	0.02	84.79	71.96
29	180	87.76	65.14	0.00	87.51	70.93
30	181	91.49	71.15	0.00	90.41	73.96
Average		79.24	62.25		80.06	66.24
Total				4.74		
Total				23.55		

Data Collected Midnight- Midnight
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Vegetable Trial Results are Available Online at:

http://www.rec.udel.edu/veggie/trialresults2001.htm