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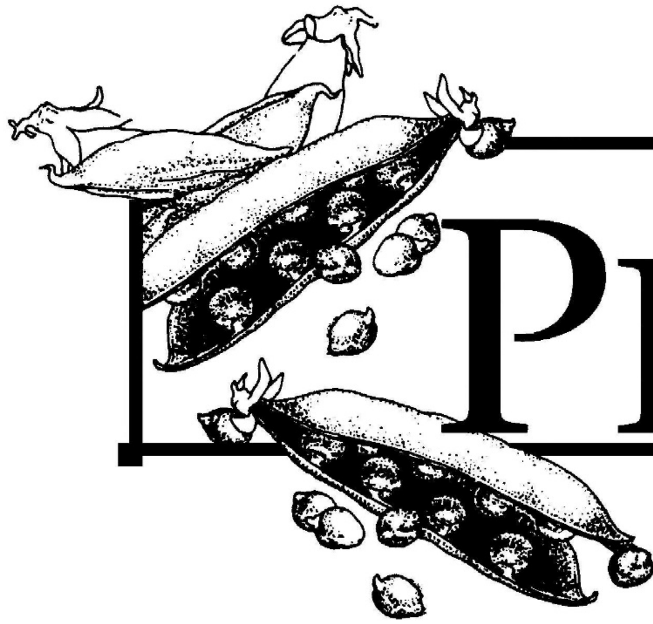

PEA

VARIETY TRIAL RESULTS

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2020

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2020 University of Delaware Pea Variety Trial

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Introduction

The 2020 Pea Variety Trials were conducted at the University of Delaware Research and Education Center. The purpose of these trials is to evaluate and identify varieties best adapted for our production region. Yield, quality and maturity are important characteristics that can vary for any one variety between production regions. Similar trials have been conducted on the farm since 1994.

Trials were planted on two dates (mid- March and mid-April) to place the varieties in the planting season appropriate for their maturity classification. This year's trials were planted on March 16 and April 17. Early maturing varieties are generally planted during the first half of the planting season and longer maturing varieties are planted in the second half. Later plantings are exposed to warmer conditions, which generate quicker accumulations of heat units. Thus, longer maturing varieties are used in later plantings.

Materials and Methods

Planting and Crop Management

Fifteen varieties were planted in each trial. The trials were located in Field 25-B at the University of Delaware Research Farm in Georgetown, DE. The field was limed and potassium was applied according to soil test results prior to planting. Both were irrigated as needed, and grown under standard commercial management practices. Weed control in both trials was good.

Planting Date: **Early Trial** – March 16, 2020; 15 varieties
Late Trial – April 17, 2020; 15 varieties

Herbicide: Pursuit @ 2 oz/A + Dual Magnum @ 1 pt/A with N-SUL 33 (27-0-0-6) at 28 gal/A (80 lbs/A of N) applied preemergence

Planting: The Almaco drill that is typically used for this trial was not available. An 8 row no-till drill was used to plant the Early Trial and a 16 row no till drill was used to plant the Late Trial. Seeding rate was 9 seeds per foot. Plots were 8 rows wide and 34 ft long in the Early Trial and 7 rows wide and 30 ft long in the Late Trial. Rows were spaced at 7 inches.

Insecticide: None

Stands: Stands in the Early Trial were low for some plots because of poor depth control for the 8-row drill used for planting. Stands were good in the Late Trial.

Plot Design: Plots were arranged in a randomized complete block design with 3 replications.

Varieties in the 2020 Early Pea Trial

Variety	Company
SV7401QH	Seminis
SV0935QF*	Seminis
Reliance*	Seminis
SV8112QH*	Seminis
PL 228*	Pure Line Seeds, Inc.
PL 11P42*	Pure Line Seeds, Inc.
Fr-43	Pure Line Seeds, Inc.
Saltingo*	Pure Line Seeds, Inc.
BSC201	Brotherton Seed Co., Inc.
BSC304*	Brotherton Seed Co., Inc.
BSC312	Brotherton Seed Co., Inc.
CS-455AF*	Crites Seed, Inc.
Jumpstart	check (Brotherton)
Tomahawk*	check (Crites)
M-14	check (Pure Line)

Varieties in the 2020 Late Pea Trial

Variety	Company
SV0823QG*	Seminis
SV0893QF	Seminis
SV6844QG*	Seminis
SV5685QG	Seminis
PL 602*	Pure Line Seeds, Inc.
PL 98-326*	Pure Line Seeds, Inc.
Dancer*	Pure Line Seeds, Inc.
EXP064	Brotherton Seed Co., Inc.
BSC712*	Brotherton Seed Co., Inc.
BSCP 070*	Brotherton Seed Co., Inc.
CS-464AF*	Crites Seed, Inc.
BSC 7120*	check (Brotherton)
PLS595*	check (Pure Line)
Concept*	check (Brotherton)
M-14	check (Pure Line)

*** Afila Variety**

Pre Harvest Data

For the Early Trial, emergence was poor for some plots due to inconsistent planting depth. Emergence was rated for each plot on a 1 to 4 scale on April 8 (23 DAP). For the Late Trial (planted using a different drill) emergence was excellent for all plots. Stand counts were not completed as typical for this trial because of COVID-19 restrictions that were in place at the time. The date of first flower and peak flowering was noted for each plot.

Harvest Procedure

Each variety was harvested as near to a tenderometer reading of 100 as possible. (A viner break-down on June 1 jammed up harvest for many of the early trial varieties). Pre-harvest samples were taken two to three days prior to reaching this maturity level whenever possible. All three replications for each variety were harvested on the same day. In the Early Trial, only two replications were harvested for some varieties because stands were too low in the third replication.

Plants were pulled from a 15 foot section of the plot so Early Trial samples were 70 ft^2 and Late Trial samples were 61.25 ft^2. This is a smaller sample than typical the 150 ft^2 because of COVID-19 related restrictions on seasonal hiring. The vines were weighed and fed into a stationary FMC viner. Shelled peas were collected and cleaned (removing leaves, stones, and other trash). The clean, shelled peas were weighed. A 700 g sub-sample was put through a size separator that segregated peas into the following sizes according to their diameter: 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 and #2 sieve size); and peas smaller than 9/32 inch (trash). After each size was weighed, peas with sieve sizes 1 through 4 were recombined into a bulk sample with the smallest (trash) peas removed. Three tenderometer readings were taken from this bulked sample. The average is reported.

Ten plants were taken from each variety and the following measurements were taken: vine length; number of nodes setting usable pods; number of pods per plant; pod length; and peas per pod. Statistics for pod length and number of peas per pod were calculated based on ten pods that were randomly selected from the ten sampled plants.

Discussion of Trial Results

The results for the two trials are reported in separate sections. Each section consists of twelve tables of results and one chart. In most tables the variety means are listed in descending order. Means followed by the same letter are not significantly different as determined by Fischer's protected LSD with 5% error (α=0.05). The LSD value, p-value for the effect of the independent variable and the coefficient of variation (CV) are included at the bottom of each table.

Temperatures were warmer than average in March and April and cooler than average in May. A late frost May 9 and 10 may have reduced yield in some of the Early Trial varieties that had just begun to flower. Rainfall levels were average for March through May and slightly lower than average in June. Irrigation was applied as necessary via an overhead linear irrigation system. Harvest of the Early Trial began on May 29, which is slightly later than the typical first harvest date for this trial. The harvest of the Late Trial began on June 12 which is typical for this trial. Complete weather data and heat unit accumulation for the trials is included in Appendices A & B.

Tables 2E reports a rating of stand emergence for the Early Trial on April 8 (23 DAP). Stands for many varieties were reduced because the depth control on the drill was inadequate and some seeds were planted too deep. Stands in the Late Trial were good however, stand count data was not collected as in past years because of restrictions on seasonal labor. Consequently there is no Table 2L in this report. All seed was treated with insecticide (either Cruiser or Lorsban) and seedcorn maggot damage was not apparent in either planting.

Tables 3E and 3L report the net and gross yields adjusted to a tenderometer reading of 100. The adjustment calculation procedure is based on the method described by Pumphrey *et al.* (see Appendix C: Adjusting Pea Yields to a T-Reading of 100). Briefly, the adjustment factor (Y) is the percent of yield at a T-reading of 100 for the T-reading at harvest (X).

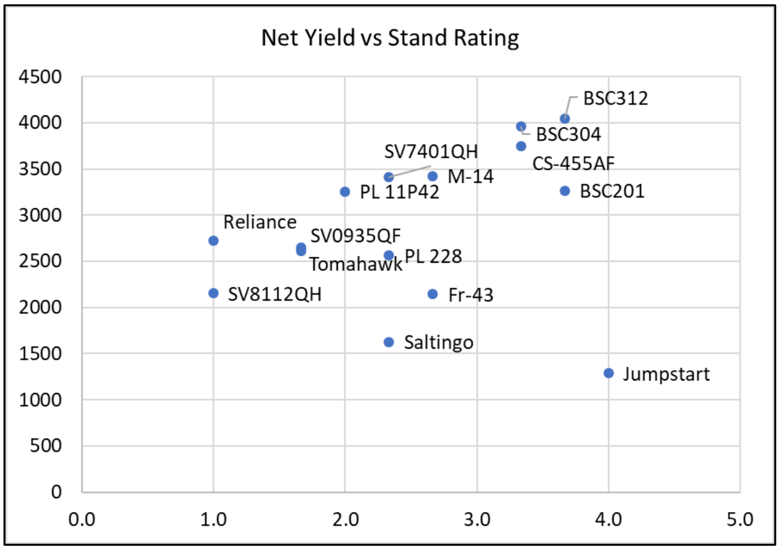
$$Y = -1059.1 - 8.405X + 200X^{1/2}$$

and

$$\text{Yield adjusted to a T-reading of 100} = \frac{\text{Yield at T-reading } X}{(Y/100)}$$

The net yield is calculated by subtracting the percent of peas smaller than 9/32 inch, trash, (as determined by sizing of a 700 g sub-sample) from the gross yield.

Yields in the Early Trial were lower than average for this trial. Average yield for the previous eight early trials is 3780 lbs/A for all varieties trialed. The average yield for the 2020 Early trial was 2859 lbs/A. Poor stand establishment likely contributed to the low yield for some varieties, since net yield is correlated with stand count for most varieties (see below). The exception to this is Jumpstart, which had good stands but low yields. Jumpstart may have been affected by the May 9/10 frost since it was flowering at that time. Yields for other varieties may also have been impacted by the late frost. The highest yielding varieties in the Early Trial were BSC312, BSC304, CS-455AF, M-14, SV7401QH, BSC201 and PL 11P42. Pure Line's 11P42 was trialed in 2016 and 2018 and performed well in both of those trials. CS-455AF and SV7401QH were trialed in 2018 and also looked good in that year. SV7401QH is a small sieve size variety and had impressive root health at harvest in 2020.



Net yield vs. stand rating for varieties in the Early Trial. Yield and stand are correlated for most varieties


Roots of SV7401QH at harvest were impressively free of disease.

Yields in the Late Trial were below average compared to what has been observed in past years for this trial. Average yield for the previous eight late trials is 3551 lbs/A for all varieties trialed. The average yield for the 2018 Late Trial was 2833 lbs/A. Four varieties that are being used by regional processors were included in the trial as checks: BSC 7120, Concept, PLS595 and M-14. The highest yielding varieties in the trial were BSC712, SV0893QF, Dancer, BSC 7120 and SV6844QG. BSC 7120 performed well in the 2018 trial and is now being used by processors, so was included as a standard and performed well this year with significantly higher net yield than the other three check varieties. Three of the other high performing varieties in 2020 also yielded well in the 2018 trial: SV0893QF, Dancer, SV6844QG and BSCP 070.

Early Trial Pre-Harvest Data

Table 1E: Flowering Data

Variety	First Flower		Full Flower	
	DAP	Heat Units	DAP	Heat Units
Jumpstart	54	731	56	767
Tomahawk	54	731	58	805
Fr-43	55	739	59	821
CS-455AF	55	739	59	821
M-14	56	767	60	851
BSC201	56	767	61	878
BSC304	56	767	61	878
PL 11P42	56	767	62	909
PL 228	57	776	63	927
Saltingo	58	805	64	959
BSC312	58	805	63	927
Reliance	60	851	66	1005
SV7401QH	61	878	65	972
SV0935QF	61	878	66	1005
SV8112QH	62	909	66	1005

Table 2E: Average Emergence Rating for Each Variety on April 8, 2020 (23 DAP)

Variety	Average Rating
Jumpstart	4.0
BSC201	3.7
BSC312	3.7
BSC304	3.3
CS-455AF	3.3
Fr-43	2.7
M-14	2.7
SV7401QH	2.3
PL 228	2.3
Saltingo	2.3
PL 11P42	2.0
SV0935QF	1.7
Tomahawk	1.7
Reliance	1.0
SV8112QH	1.0

Emergence for each plot was rated on a 1-4 scale with 1 being very low emergence and 4 good emergence. The average rating for three plots is reported.

Early Trial Harvest Data

Table 3E: Weight of Vines from 150 ft^2 Harvest Area (lbs.)

Variety	Vine Weight (lbs.)	
SV7401QH	92	a
BSC312	80	ab
Fr-43	74	*
BSC201	73	ab
CS-455AF	71	ab
M-14	69	ab
PL 228	69	ab
BSC304	68	abc
PL 11P42	61	*
Tomahawk	59	*
Jumpstart	56	bc
Reliance	55	*
SV8112QH	47	*
SV0935QF	44	*
Saltingo	43	c
p-value	0.0470	
LSD	25.2	
CV	21.06	

* average of 2 reps

Although a 150 ft^2 area was not harvested in 2020, the weight reported here is adjusted to 150 ft^2 to facilitate comparison to other years.

Table 4E: Net Yields (% Trash Subtracted) and Gross Yields Adjusted to a Tenderometer Reading of 100 (lbs/A)

Variety	Adj. Net Yield (lbs/A)		Adj. Gross Yield (lbs/A)	
BSC312	4046	a	4162	a
BSC304	3959	a	4042	ab
CS-455AF	3747	ab	3852	ab
M-14	3426	ab	3586	ab
SV7401QH	3412	ab	3944	ab
BSC201	3267	ab	3548	ab
PL 11P42	3259	*	3608	*
Reliance	2725	*	2796	*
SV0935QF	2652	*	2749	*
Tomahawk	2615	*	2700	*
PL 228	2561	bc	2840	bc
SV8112QH	2153	*	2216	*
Fr-43	2146	*	2623	*
Saltingo	1629	cd	1900	c
Jumpstart	1291	d	1847	c
p-value	0.0009		0.0046	
LSD	1187.8		1255.1	
CV	22.59		21.96	

* average of 2 reps

Table 5E: Pea Size (% peas by weight in each class) and Tenderometer Reading at Harvest

Variety	% #4		% #3		% #1 & #2		% Trash		T-reading at Harvest	
Tomahawk	21.4	*	52.0	*	23.4	*	3.2	*	156	*
CS-455AF	17.1	a	52.1	a	28.0	e	2.9	c	124	c
BSC304	14.0	b	51.1	a	32.7	de	2.1	c	161	a
M-14	11.6	bc	48.3	ab	35.5	de	4.7	c	129	bc
BSC312	11.6	bc	52.6	a	33.1	de	2.7	c	122	c
Reliance	11.4	*	44.4	*	41.5	*	2.7	*	156	*
PL 11P42	11.0	*	43.7	*	36.0	*	9.3	*	136	*
BSC201	9.6	cd	45.4	abc	37.1	d	7.9	bc	131	b
PL 228	7.8	de	37.8	bc	45.4	c	9.1	bc	122	c
Saltingo	4.9	ef	33.0	c	48.9	bc	13.2	b	98	e
SV8112QH	3.5	*	42.6	*	51.1	*	2.9	*	167	*
SV0935QF	3.1	*	39.0	*	54.3	*	3.6	*	182	*
SV7401QH	2.6	fg	15.6	d	68.5	a	13.4	b	105	d
Jumpstart	0.9	g	15.2	d	54.1	b	29.9	a	106	d
Fr-43	0.4	*	10.1	*	71.1	*	18.4	*	127	*
p-value	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
LSD	3.02		12.39		8.25		7.74		6.8	
CV	19.66		18.36		11.20		46.85		5.92	

* average of 2 reps

Table 6E: Tenderometer Reading at Harvest

Variety	Tenderometer Reading		Standard Deviation of T-Reading
SV0935QF	182	*	*
SV8112QH	167	*	*
BSC304	161	a	11.9
Tomahawk	156	*	*
Reliance	156	*	*
PL 11P42	136	*	*
BSC201	131	b	10.1
M-14	129	bc	9.2
Fr-43	127	*	*
CS-455AF	124	c	4.3
PL 228	122	c	12.5
BSC312	122	c	8.5
Jumpstart	106	d	5.7
SV7401QH	105	d	4.5
Saltingo	98	e	9.0
p-value	<0.0001		
LSD	6.8		
CV	5.92		

* average of 2 reps

Plant Characteristics for Early Trial Varieties Based on a 10-Plant Sample

Table 7E: Vine Length in Centimeters

Variety	Vine Length (cm)	
Fr-43	58	a
CS-455AF	54	b
Jumpstart	52	bc
PL 228	51	bcd
Tomahawk	48	cde
BSC304	47	de
Saltingo	46	e
BSC312	46	e
M-14	46	e
SV0935QF	44	ef
Reliance	44	efg
BSC201	41	fgh
PL 11P42	41	fgh
SV7401QH	40	gh
SV8112QH	39	h
p-value	<0.0001	
LSD	4.1	
CV	9.90	

Table 8E: Number of Pods per Plant

Variety	Pods/Plant	
SV7401QH	5.4	a
Fr-43	4.9	ab
M-14	4.6	abc
CS-455AF	4.6	abc
Reliance	4.2	bcd
Tomahawk	4.1	bcd
SV0935QF	4.0	bcde
BSC304	3.8	cdef
PL 228	3.4	defg
BSC201	3.2	defg
SV8112QH	3.0	efg
BSC312	3.0	efg
PL 11P42	2.8	fg
Saltingo	2.7	g
Jumpstart	2.7	g
p-value	<0.0001	
LSD	1.07	
CV	32.05	

Table 9E: Number of Pod-Bearing Nodes per Plant

Variety	Nodes w/ Pods/Plant
BSC304	3.1 a
M-14	3.0 ab
Fr-43	2.9 abc
SV7401QH	2.8 abcd
Tomahawk	2.7 abcd
CS-455AF	2.7 abcd
Reliance	2.5 bcde
Jumpstart	2.4 cdef
SV0935QF	2.3 def
BSC201	2.3 def
PL 11P42	2.1 ef
PL 228	2.0 ef
SV8112QH	1.9 f
Saltingo	1.9 f
BSC312	1.9 f
p-value	<0.0001
LSD	0.57
CV	26.54

Table 10E: Average Number of Peas/Pod

Variety	Peas/Pod
SV7401QH	7.6 a
Reliance	7.4 ab
SV0935QF	7.0 abc
Saltingo	6.8 abcd
PL 11P42	6.4 bcde
Jumpstart	6.3 cde
M-14	6.2 cdef
Tomahawk	5.9 def
Fr-43	5.7 efg
BSC304	5.5 efg
BSC312	5.4 efg
SV8112QH	5.2 fgh
BSC201	4.8 gh
PL 228	4.7 gh
CS-455AF	4.3 h
p-value	<0.0001
LSD	1.04
CV	19.83

Table 11E: Average Pod Length (cm)

Variety	Pod Length (cm)	
Saltingo	8.5	a
SV0935QF	7.9	b
SV7401QH	7.8	bc
PL 228	7.7	bc
CS-455AF	7.7	bc
Reliance	7.5	bc
Jumpstart	7.3	cd
Tomahawk	7.3	cd
PL 11P42	7.0	de
M-14	7.0	de
BSC304	6.9	def
BSC312	6.9	def
Fr-43	6.5	efg
SV8112QH	6.4	fg
BSC201	6.1	g
p-value	<0.0001	
LSD	0.54	
CV	8.44	

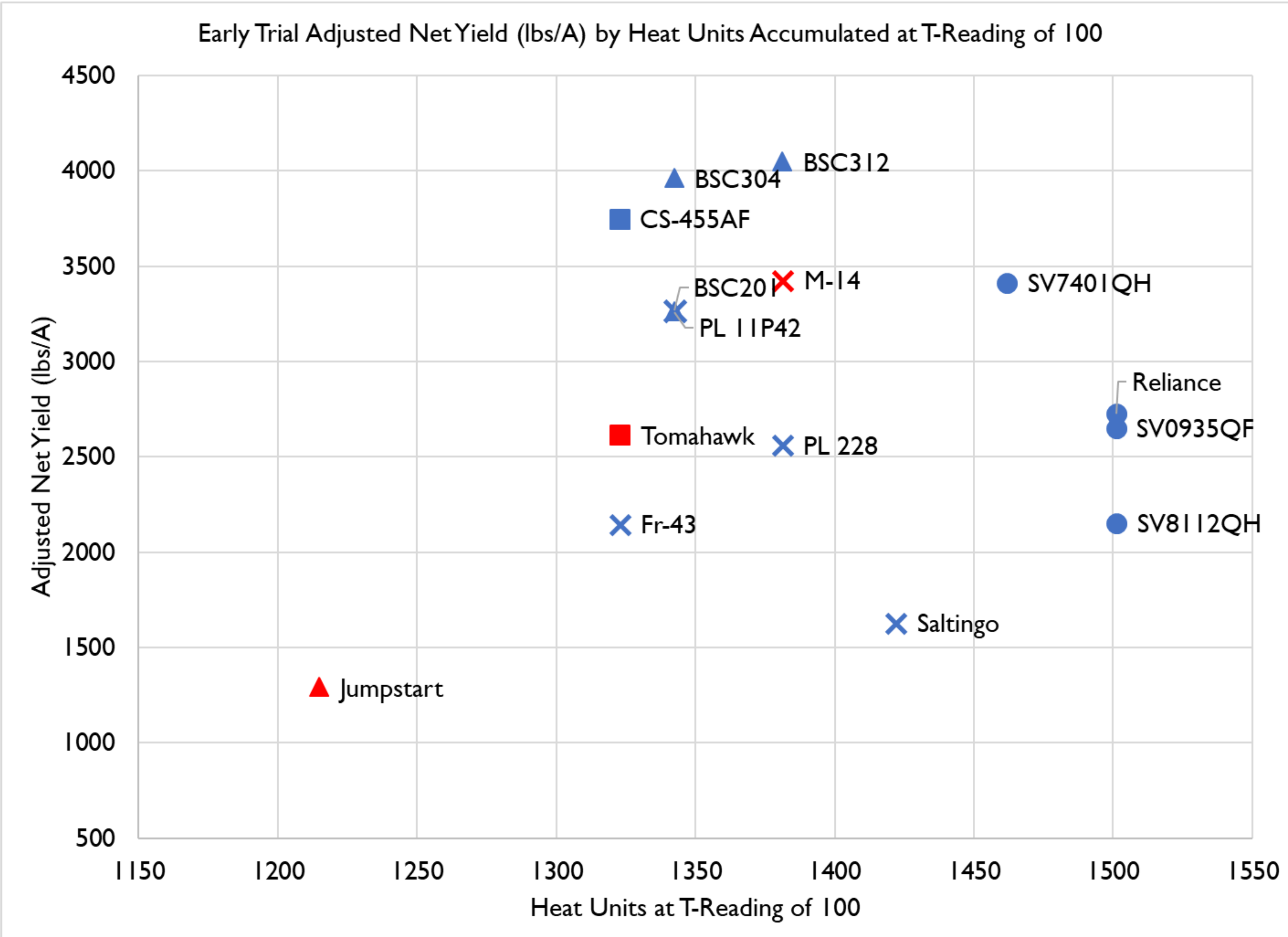
Early Trial Maturity Data

Table 12E: Tenderometer Readings Leading Up To and Including Harvest

Variety	Reported Heat Units	T-Readings Up to and Including Harvest by Date and Accumulated Heat Units										
		29 May	30 May	31 May	1 Jun	2 Jun	3 Jun	4 Jun	5 Jun	6 Jun	7 Jun	8 Jun
		1252	1285	1323	1342	1381	1422	1462	1501	1542	1573	1615
Jumpstart	1110	**106***										
Tomahawk	1160						**156**					
BSC201	1240							**131**				
Fr-43	1250						**127**					
Saltingo	1250							**98**				
CS-455AF	1250						**124**					
PL 228	1275							**122**				
PL 11P42	1275							**136**				
BSC304	1280								**161**			
M-14	1330								**129**			
BSC312	1330								**122**			
SV7401QH	1340								**105**			
SV0935QF	1340								90			**182**
Reliance	1420								96			**156**
SV8112QH	1430								92			**167**

*Bold numbers indicated the day on which the variety was harvested and are an average of three samples from each of three replications

Chart 1E: Adjusted Net Yield (lbs/A) by Heat Units Accumulated at T-Reading of 100



Late Trial Pre-Harvest Data

Table 1L: Flowering Data

Variety	First Flower		Full Flower	
	DAP	Heat Units	DAP	Heat Units
M-14	40	673	43	779
EXP064 (BSCP064)	46	847	50	1009
CS-464AF	46	847	50	1009
PL 602	47	888	49	968
BSC 7120	47	888	49	968
BSC712	47	888	50	1009
PL 98-326	48	928	52	1068
BSCP 070	48	928	52	1068
SV0893QF	49	968	52	1068
SV6844QG	49	968	53	1100
PLS595	49	968	52	1068
Concept	49	968	52	1068
SV0823QG	49	968	53	1100
Dancer	49	968	52	1068
SV5685QG	51	1040	56	1214

Late Trial Harvest Data

Table 3L: Weight of Vines from 150 ft^2 Harvest Area

Variety	Vine Weight (lbs.)	
SV0823QG	88	a
Dancer	87	a
BSC 7120	86	a
SV0893QF	82	ab
BSC712	79	abc
CS-464AF	68	bcd
M-14	63	cde
BSCP 070	61	de
SV6844QG	58	def
PL 98-326	57	def
Concept	55	def
PL 602	52	def
PLS595	47	ef
EXP064 (BSCP064)	47	ef
SV5685QG	42	f
p-value	<0.0001	
LSD	16.9	
CV	15.58	

Although a 150 ft^2 area was not harvested in 2020, the weight reported here is adjusted to 150 ft^2 to facilitate comparison to other years.

Table 4L: Net Yields (% Trash Subtracted) and Gross Yields Adjusted to a Tenderometer Reading of 100

Variety[1]	Adj. Net Yield (lbs/A)	Adj. Gross Yield (lbs/A)
BSC712	4465 a	4679 a
SV0893QF	3984 ab	4246 abc
Dancer	3928 ab	4316 ab
BSC 7120	3887 ab	3941 abcd
SV6844QG	3866 ab	4145 abc
SV0823QG	3510 bc	3665 bcd
BSCP 070	3488 bc	3721 bcd
Concept	3110 c	3238 de
CS-464AF	2967 c	3492 cde
PL 602	2047 d	2721 ef
PLS595	2036 d	2086 fg
PL 98-326	1778 de	2264 fg
M-14	1537 de	1612 g
EXP064 (BSCP064)	1226 ef	1953 fg
SV5685QG	665 f	719 h
p-value	<0.0001	<0.0001
LSD	726.2	804.9
CV	15.33	15.43

[1]Bold variety name indicates that peas <9/13 inch were included in net yield.

Table 5L: Pea Size (% peas by weight in each class) and Tenderometer Reading at Harvest

Variety	% #4	% #3	% #1 & #2	% Trash	T-reading at Harvest
BSC 7120	75.2 a	16.4 f	7.1 g	1.3 f	162 b
SV5685QG	46.5 b	24.1 e	18.4 f	11.0 cd	144 c
PLS595	38.8 bc	35.9 d	22.7 ef	2.6 ef	99 efg
BSC712	35.2 bc	36.0 d	24.4 ef	4.5 def	98 efg
SV0893QF	32.7 cd	33.7 d	27.8 e	5.8 def	103 ef
Concept	21.6 de	45.6 bc	28.7 e	4.1 def	128 d
SV0823QG	19.5 ef	49.2 ab	26.9 ef	4.4 def	125 d
SV6844QG	15.8 efg	38.3 d	39.3 cd	6.7 def	91 g
CS-464AF	13.3 efg	26.2 e	45.9 c	14.6 c	95 fg
M-14	10.5 efgh	54.8 a	30.3 de	4.4 def	106 e
BSCP 070	8.1 fgh	45.6 bc	39.9 c	6.3 def	178 a
Dancer	4.5 gh	39.9 cd	46.6 c	9.0 cde	103 ef
PL 602	0.5 h	14.9 f	60.6 b	23.9 b	97 efg
PL 98-326	0.3 h	7.3 g	70.5 a	21.9 b	97 efg
EXP064	0.0 h	2.0 g	62.3 ab	35.8 a	99 efg
p-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
LSD	12.15	6.49	9.20	7.00	9.9
CV	33.7919	12.383	14.975	40.139	5.162

Table 6L: Tenderometer Reading at Harvest

Variety	Tenderometer Reading	Standard Deviation of T-Reading
BSCP 070	178 a	10.0
BSC 7120	162 b	7.9
SV5685QG	144 c	0.7
Concept	128 d	5.1
SV0823QG	125 d	6.8
M-14	106 e	6.9
SV0893QF	103 ef	7.3
Dancer	103 ef	0.9
EXP064 (BSCP064)	99 efg	7.8
PLS595	99 efg	1.7
BSC712	98 efg	7.0
PL 98-326	97 efg	4.3
PL 602	97 efg	6.3
CS-464AF	95 fg	5.0
SV6844QG	91 g	3.1
p-value	<0.0001	
LSD	9.9	
CV	5.16	

Plant Characteristics for Late Trial Varieties Based on a 10-Plant Sample

Table 7L: Vine Length in Centimeters

Variety	Vine Length (cm)	
BSC 7120	58	a
PL 98-326	53	b
CS-464AF	53	b
SV5685QG	52	b
BSC712	52	b
SV0893QF	51	b
M-14	46	c
SV6844QG	45	cd
SV0823QG	45	cd
BSCP 070	45	cd
EXP064 (BSCP064)	44	cd
PL 602	43	cd
Dancer	43	cd
PLS595	42	d
Concept	32	e
p-value	<0.0001	
LSD	4.0	
CV	9.73	

Table 8L: Number of Pods per Plant

Variety	Pods/Plant	
PL 98-326	4.9	a
BSCP 070	3.8	b
EXP064 (BSCP064)	3.5	bc
CS-464AF	3.5	bc
SV6844QG	3.2	bcd
BSC 7120	3.1	bcd
SV0893QF	2.7	cde
PL 602	2.7	cde
BSC712	2.6	cdef
Concept	2.4	def
Dancer	2.3	def
SV0823QG	2.1	ef
SV5685QG	1.7	f
M-14	1.7	f
PLS595	1.7	f
p-value	<0.0001	
LSD	0.93	
CV	37.52	

Table 9L: Number of Pod-Bearing Nodes per Plant

Variety	Nodes w/ Pods/Plant
PL 98-326	2.5 a
SV6844QG	2.2 ab
BSCP 070	2.2 ab
CS-464AF	1.9 bc
EXP064 (BSCP064)	1.8 bcd
SV0893QF	1.7 cde
PL 602	1.7 cde
BSC 7120	1.7 cde
BSC712	1.7 cde
Concept	1.5 cdef
SV5685QG	1.4 def
M-14	1.3 ef
SV0823QG	1.2 f
PLS595	1.2 f
Dancer	1.1 f
p-value	<0.0001
LSD	0.47
CV	31.58

Table 10L: Average Number of Peas per Pod

Variety	Peas/Pod
PLS595	7.5 a
SV6844QG	7.3 ab
EXP064 (BSCP064)	6.8 ab
PL 98-326	6.6 abc
Concept	6.5 abcd
PL 602	6.4 abcde
Dancer	6.4 abcde
SV0893QF	6.2 abcde
SV0823QG	6.0 bcdef
BSCP 070	6.0 bcdef
CS-464AF	6.0 bcdef
SV5685QG	5.4 cdef
BSC 7120	5.2 def
BSC712	5.1 ef
M-14	4.7 f
p-value	0.0011
LSD	1.32
CV	24.38

Table 11L: Average Pod Length in Centimeters

Variety	Pod Length (cm)	
PLS595	8.9	a
SV5685QG	8.9	a
SV6844QG	7.4	b
Dancer	6.7	bc
SV0893QF	6.7	cd
SV0823QG	6.4	cd
CS-464AF	6.4	cd
M-14	6.2	cde
Concept	6.2	cde
PL 98-326	6.1	cdef
PL 602	6.0	def
EXP064 (BSCP064)	5.6	efg
BSC712	5.5	efg
BSC 7120	5.4	fg
BSCP 070	5.2	g
p-value	<0.0001	
LSD	0.72	
CV	12.51	

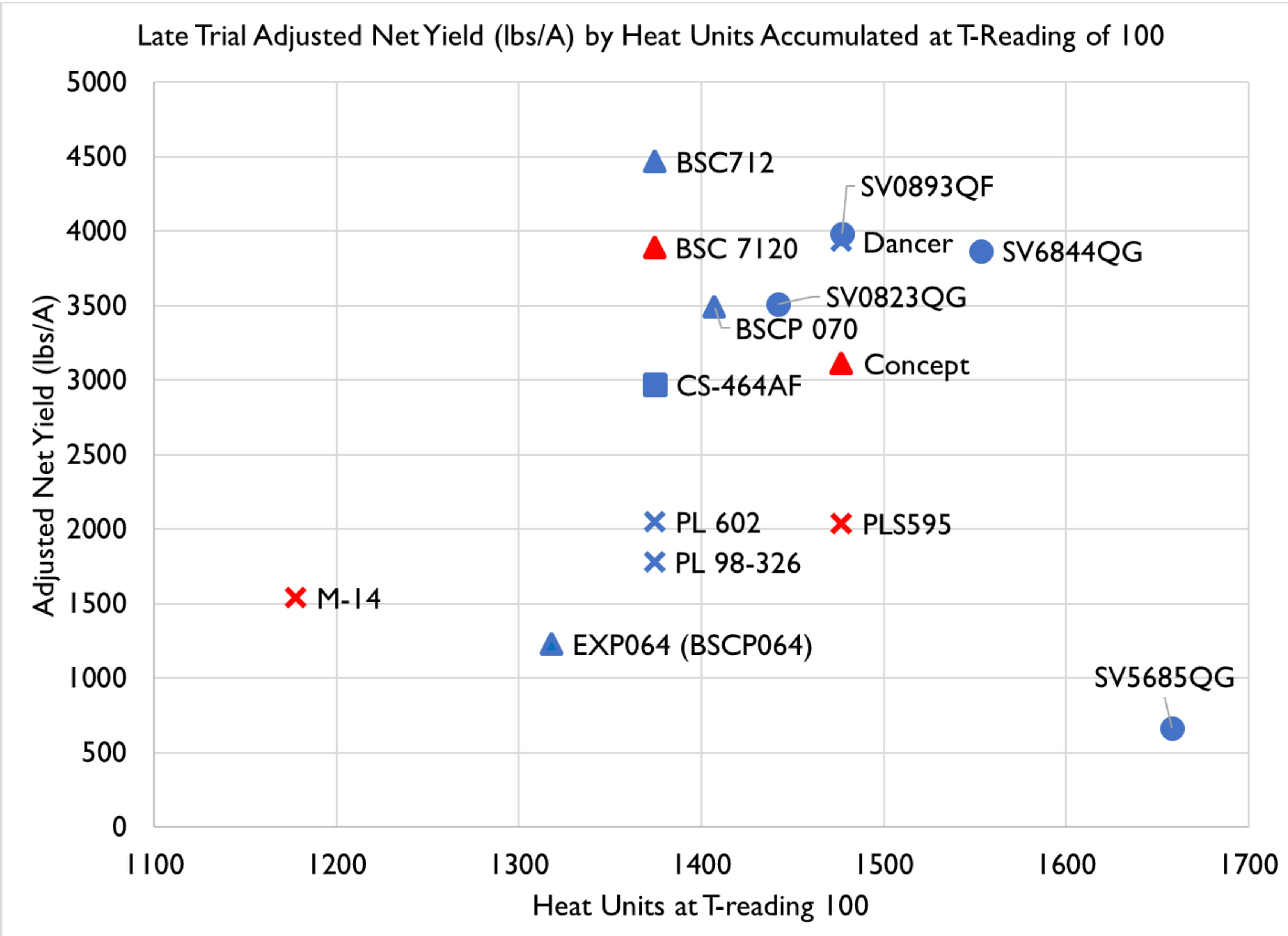
Late Trial Maturity Data

Table 12L: Tenderometer Readings Leading Up To and Including Harvest

Variety	Reported Heat Units	Date and Accumulated Heat Units													
		12 Jun	13 Jun	14 Jun	15 Jun	16 Jun	17 Jun	18 Jun	19 Jun	20 Jun	21 Jun	22 Jun	23 Jun		29 Jun
		1214	1243	1267	1292	1318	1341	1375	1407	1442	1477	1514	1553		1780
M-14	1330	**106***												**T**	
PL 98-326	1400					72			**97**					**I**	
EXP064	1420				77		**99**							**M**	
BSC712	1480					83			**98**					**E**	
PL 602	1500					76			**97**						
CS-464AF	1510					94			**95**					**W**	
SV0823QG	1525								73			**125**		**A**	
SV0893QF	1525								69			**103**		**R**	
BSC 7120	1530								102			**162**		**P**	
Dancer	1550								72			**103**			
PLS595	1550								81			**99**			
BSCP 070	1570											152	**178**		
SV6844QG	1600											91	**91**		
Concept	1620											113	**128**		
SV5685QG	1750														**144**

*Bold numbers indicated the day on which the variety was harvested and are an average of three samples from each of three replications

Chart 1L: Adjusted Net Yield (lbs/A) by Heat Units Accumulated at T-Reading of 100



Appendix A: Weather Data for 2020 Early Pea Variety Trial

Date	DAP	High	Low	Daily Heat Units	Accumulated Heat Units	Daily Rainfall	Accumulated Rainfall
16-Mar	0	50.3	29.0	0.0	0	0.00	0.00
17-Mar	1	62.2	41.8	12.0	12	0.00	0.00
18-Mar	2	54.5	40.8	1.0	13	0.00	0.00
19-Mar	3	67.2	47.8	17.5	31	0.36	0.36
20-Mar	4	82.8	55.7	2.0	33	0.00	0.36
21-Mar	5	72.2	43.5	17.9	50	0.50	0.86
22-Mar	6	48.2	36.4	3.0	53	0.00	0.86
23-Mar	7	51.5	41.1	6.3	60	0.51	1.37
24-Mar	8	53.5	38.5	4.0	64	0.00	1.37
25-Mar	9	48.5	41.8	5.2	69	0.36	1.73
26-Mar	10	58.4	32.4	5.0	74	0.00	1.73
27-Mar	11	65.6	47.7	16.7	90	0.01	1.74
28-Mar	12	55.5	50.6	6.0	96	0.73	2.47
29-Mar	13	66.2	49.4	17.8	114	0.00	2.47
30-Mar	14	70.0	46.6	7.0	121	0.00	2.47
31-Mar	15	47.8	41.0	4.4	126	0.04	2.51
1-Apr	16	53.9	40.0	8.0	134	0.01	2.52
2-Apr	17	60.2	38.7	9.5	143	0.00	2.52
3-Apr	18	58.8	45.3	9.0	152	0.00	2.52
4-Apr	19	52.1	39.2	5.7	158	0.00	2.52
5-Apr	20	64.7	36.5	10.0	168	0.00	2.52
6-Apr	21	68.1	44.5	16.3	184	0.00	2.52
7-Apr	22	71.4	41.2	11.0	195	0.02	2.54
8-Apr	23	76.8	50.5	23.7	219	0.14	2.68
9-Apr	24	75.3	49.0	12.0	231	0.03	2.71
10-Apr	25	50.9	40.9	5.9	237	0.00	2.71
11-Apr	26	59.7	33.1	13.0	250	0.00	2.71
12-Apr	27	73.0	39.0	16.0	266	0.08	2.79
13-Apr	28	77.2	58.5	14.0	280	1.04	3.83
14-Apr	29	60.9	44.8	12.9	292	0.00	3.83
15-Apr	30	51.3	35.3	15.0	307	0.22	4.05
16-Apr	31	52.3	35.0	3.7	311	0.00	4.05
17-Apr	32	58.9	30.2	16.0	327	0.00	4.05
18-Apr	33	60.7	34.0	7.4	334	0.11	4.16
19-Apr	34	62.0	30.1	17.0	351	0.00	4.16
20-Apr	35	57.7	44.5	11.1	363	0.08	4.24
21-Apr	36	68.2	44.1	18.0	381	0.16	4.40
22-Apr	37	57.8	33.5	5.7	386	0.00	4.40
23-Apr	38	64.7	38.4	19.0	405	0.32	4.72
24-Apr	39	60.4	49.0	14.7	420	0.95	5.67
25-Apr	40	61.9	47.5	20.0	440	0.15	5.82
26-Apr	41	63.4	49.0	16.2	456	0.16	5.98
27-Apr	42	54.9	43.6	21.0	477	0.05	6.03
28-Apr	43	62.3	39.1	10.7	488	0.00	6.03
29-Apr	44	72.1	50.1	22.0	510	0.00	6.03
30-Apr	45	71.8	57.9	24.9	535	0.70	6.73
1-May	46	63.6	55.4	23.0	558	0.02	6.75
2-May	47	70.0	51.2	20.6	578	0.00	6.75
3-May	48	78.6	56.6	24.0	602	0.29	7.04
4-May	49	73.2	55.2	24.2	626	1.37	8.41
5-May	50	59.1	46.6	25.0	651	0.18	8.59
6-May	51	50.8	46.0	8.4	660	0.20	8.79
7-May	52	63.3	44.2	26.0	686	0.01	8.80
8-May	53	69.9	47.0	18.5	704	0.11	8.91

9-May	54	49.8	35.4	27.0	731	0.09	9.00
10-May	55	61.0	33.4	7.2	739	0.00	9.00
11-May	56	63.2	47.4	28.0	767	0.00	9.00
12-May	57	59.2	40.7	10.0	776	0.00	9.00
13-May	58	67.5	36.6	29.0	805	0.00	9.00
14-May	59	72.8	39.2	16.0	821	0.00	9.00
15-May	60	82.9	63.8	30.0	851	0.00	9.00
16-May	61	78.5	54.9	26.7	878	0.00	9.00
17-May	62	66.2	52.4	31.0	909	0.00	9.00
18-May	63	61.2	54.6	17.9	927	0.07	9.07
19-May	64	63.6	52.1	32.0	959	0.00	9.07
20-May	65	57.2	49.3	13.3	972	0.00	9.07
21-May	66	66.1	49.4	33.0	1005	0.00	9.07
22-May	67	77.2	55.5	26.4	1032	0.49	9.56
23-May	68	80.7	56.3	34.0	1066	0.58	10.14
24-May	69	61.1	53.9	17.5	1083	0.00	10.14
25-May	70	69.9	56.2	35.0	1118	0.01	10.15
26-May	71	74.5	56.8	25.7	1144	0.00	10.15
27-May	72	78.1	57.3	36.0	1180	0.05	10.20
28-May	73	82.0	68.4	35.2	1215	0.33	10.53
29-May	74	86.4	70.2	37.0	1252	0.02	10.55
30-May	75	82.4	63.2	32.8	1285	0.00	10.55
31-May	76	73.3	54.0	38.0	1323	0.00	10.55
1-Jun	77	71.1	48.2	19.7	1342	0.00	10.55
2-Jun	78	75.2	54.6	39.0	1381	0.00	10.55
3-Jun	79	90.3	70.7	40.5	1422	0.00	10.55
4-Jun	80	93.2	68.2	40.0	1462	0.00	10.55
5-Jun	81	87.8	71.0	39.4	1501	0.00	10.55
6-Jun	82	90.0	72.7	41.0	1542	0.00	10.55
7-Jun	83	80.1	61.9	31.0	1573	0.00	10.55
8-Jun	84	80.4	54.5	42.0	1615	0.00	10.55

Appendix B: Weather Data for 2020 Late Pea Variety Trial

Date	DAP	High	Low	Daily Heat Units	Accumulated Heat Units	Daily Rainfall/ Irrigation*	Accumulated Rainfall/ Irrigation
17-Apr	0	58.9	30.2	0.0	0	0.00	0.00
18-Apr	1	60.7	34.0	7.4	7	0.11	0.11
19-Apr	2	62.0	30.1	6.1	13	0.00	0.11
20-Apr	3	57.7	44.5	11.1	25	0.08	0.19
21-Apr	4	68.2	44.1	16.2	41	0.16	0.35
22-Apr	5	57.8	33.5	5.7	46	0.00	0.35
23-Apr	6	64.7	38.4	11.6	58	0.32	0.67
24-Apr	7	60.4	49.0	14.7	73	0.95	1.62
25-Apr	8	61.9	47.5	14.7	87	0.15	1.77
26-Apr	9	63.4	49.0	16.2	103	0.16	1.93
27-Apr	10	54.9	43.6	9.3	113	0.05	1.98
28-Apr	11	62.3	39.1	10.7	123	0.00	1.98
29-Apr	12	72.1	50.1	21.1	145	0.00	1.98
30-Apr	13	71.8	57.9	24.9	169	0.70	2.68
1-May	14	63.6	55.4	19.5	189	0.02	2.70
2-May	15	70.0	51.2	20.6	209	0.00	2.70
3-May	16	78.6	56.6	27.6	237	0.29	2.99
4-May	17	73.2	55.2	24.2	261	1.37	4.36
5-May	18	59.1	46.6	12.9	274	0.18	4.54
6-May	19	50.8	46.0	8.4	283	0.20	4.74
7-May	20	63.3	44.2	13.8	296	0.01	4.75
8-May	21	69.9	47.0	18.5	315	0.11	4.86
9-May	22	49.8	35.4	2.6	317	0.09	4.95
10-May	23	61.0	33.4	7.2	325	0.00	4.95
11-May	24	63.2	47.4	15.3	340	0.00	4.95
12-May	25	59.2	40.7	10.0	350	0.00	4.95
13-May	26	67.5	36.6	12.1	362	0.00	4.95
14-May	27	72.8	39.2	16.0	378	0.00	4.95
15-May	28	82.9	63.8	33.4	411	0.00	4.95
16-May	29	78.5	54.9	26.7	438	0.00	4.95
17-May	30	66.2	52.4	19.3	457	0.00	4.95
18-May	31	61.2	54.6	17.9	475	0.07	5.02
19-May	32	63.6	52.1	17.9	493	0.00	5.02
20-May	33	57.2	49.3	13.3	506	0.00	5.02
21-May	34	66.1	49.4	17.8	524	0.00	5.02
22-May	35	77.2	55.5	26.4	550	0.49	5.51
23-May	36	80.7	56.3	28.5	579	0.58	6.09
24-May	37	61.1	53.9	17.5	596	0.00	6.09
25-May	38	69.9	56.2	23.1	619	0.01	6.10
26-May	39	74.5	56.8	25.7	645	0.00	6.10
27-May	40	78.1	57.3	27.7	673	0.05	6.15
28-May	41	82.0	68.4	35.2	708	0.33	6.48
29-May	42	86.4	70.2	38.3	746	0.02	6.50
30-May	43	82.4	63.2	32.8	779	0.00	6.50
31-May	44	73.3	54.0	23.7	803	0.00	6.50
1-Jun	45	71.1	48.2	19.7	822	0.00	6.50
2-Jun	46	75.2	54.6	24.9	847	0.00	6.50
3-Jun	47	90.3	70.7	40.5	888	0.00	6.50
4-Jun	48	93.2	68.2	40.7	928	0.00	6.50
5-Jun	49	87.8	71.0	39.4	968	0.00	6.50
6-Jun	50	90.0	72.7	41.4	1009	0.00	6.50
7-Jun	51	80.1	61.9	31.0	1040	0.00	6.50
8-Jun	52	80.4	54.5	27.5	1068	0.00	6.50

9-Jun	53	89.6	54.7	32.2	1100	0.00	6.50
10-Jun	54	91.6	72.3	42.0	1142	0.00	6.50
11-Jun	55	82.6	70.4	36.5	1178	1.48	7.98
12-Jun	56	85.3	67.2	36.3	1214	0.01	7.99
13-Jun	57	78.2	59.5	28.9	1243	0.00	7.99
14-Jun	58	72.4	55.6	24.0	1267	0.00	7.99
15-Jun	59	71.3	58.5	24.9	1292	0.00	7.99
16-Jun	60	71.4	60.4	25.9	1318	0.00	7.99
17-Jun	61	66.1	60.4	23.3	1341	0.25	8.24
18-Jun	62	81.9	64.9	33.4	1375	0.02	8.26
19-Jun	63	83.7	61.8	32.8	1407	0.00	8.26
20-Jun	64	84.3	65.1	34.7	1442	0.00	8.26
21-Jun	65	83.4	66.4	34.9	1477	0.70	8.96
22-Jun	66	87.6	66.0	36.8	1514	0.01	8.97
23-Jun	67	91.0	68.0	39.5	1553	0.00	8.97
24-Jun	68	84.2	68.2	36.2	1590	0.01	8.98
25-Jun	69	80.1	67.9	34.0	1624	0.05	9.03
26-Jun	70	86.3	62.7	34.5	1658	0.00	9.03
27-Jun	71	90.4	71.9	41.2	1699	0.00	9.03
28-Jun	72	89.8	72.3	41.1	1740	0.00	9.03
29-Jun	73	89.1	70.6	39.9	1780	0.00	9.03

Appendix C: Adjusting Pea Yields to a T-reading of 100

Pumphery FV, RE Ramig, RR Allmoras. 1975 "Yield tenderness relationships in 'Dark Skinned Perfection' peas. Journal of the American Society of Horticultural Science. 100:507-509.

Yield-Tenderness Relationships in 'Dark Skinned Perfection' Peas[1]

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Abstract. Maturity effects on yield of fresh peas (*Pisum sativum* L.) were identified by yield-tenderometer measurements. A percent yield-tenderometer reading relationship was shown to be a useful means for yield adjustment to a common maturity—100 tenderometer reading. Analysis of random error in the predicted percent yield, as a function of tenderometer reading, indicates the need to plan harvests within the 90 to 110 tenderometer range. Alternatively, the yield-tenderometer reading relationships show the possible magnitude of errors incurred in comparing green pea yields when no adjustment is made for dissimilar tenderometer ratings.

Improved techniques are needed for determining and comparing fresh pea (*Pisum sativum* L.) yields. Expressions of fresh pea yields are generally not precise because of harvest at a growth stage when fresh pea wt is increasing rapidly while tenderness may decrease even more rapidly. Pea yields may increase as much as 900 kg/ha daily when growth conditions are favorable. Such a yield increase often causes yield differences between treatments only because the treatments affected maturity. Examples of such treatments are comparisons involving cultivars, tillage, fertilizer, irrigation, or herbicides.

The need for comparing yields of processing peas at a common tenderometer rating, such as 100, has been suggested repeatedly, but, unfortunately there is little published information. Yield and tenderness are inversely related: i.e., yield increases as tenderness decreases (tenderometer readings increase). However, changes in yield and tenderometer readings are generally not a linear function of time (2, 3, 4, 6). Yield increases per unit of increase in tenderometer readings are generally greater when tenderometer values are below 100-to 120 than at higher tenderometer values. Hagedorn et al. (1) reported an unusual linear relationship between yield and tenderometer reading up through readings of 150.

Adjustments of absolute yield to a common base of 100 tenderometer reading is complicated, because temporal changes in yield and tenderometer reading vary between years, fields, and cultivars. Some of the factors influencing increase of fresh pea wt and associated change in tenderness are temperature, wind, humidity, available soil moisture, and soil fertility. However, temperature and moisture are the dominating factors. Yield differences produced by these factors, along with seasonal and field variations preclude direct adjustments of yield based on tenderness rating, i.e., *x* pounds of peas per unit change in tenderometer reading. Norton et al. (4) presented yield-tenderness relationships indirectly in terms of percent yield at a given tenderometer reading. The method for adjusting fields was developed by H. K. Schultz and M. W. Carstens. They used the yield at 100 tenderometer reading as 100 percent yield. Kramer (2) and Sayre (7) used percent of maximum yield as their expression of the observed yields at various tenderometer readings.

Our objectives were to emphasize the need for comparing yields of fresh peas at a common tenderometer reading, and to present additional data in support of the Norton et al. (4) method for adjusting yields.

Methods and Procedures

Dark Skinned Perfection peas were grown in 17 field experiments from which fresh pea yields and tenderness evaluations were made. The experiments were conducted on or near the Columbia Basin Research Center, Pendleton, Oregon. Seeding rates varied from about 130 to 230 kg/ha, in row spacings varying from 15 to 20 cm. Plant environment varied considerably because the data were collected during 11 years from experiments testing fertilizers, herbicides, and tillage—all 3 factors alone or in various combinations. All experiments were dryland, except 2 which were irrigated. In the dryland experiments, about 61 percent of the evapotranspiration was derived from soil water stored prior to pea planting. Longterm rainfall averages during the growing season for peas are 3.9, 3.7, 3.4, and 3.5 cm, respectively, for March, April, May, and June at the Columbia Basin Research Center. Corresponding average monthly temperatures are 6.1, 10.0, 13.3, and 17.2°C.

Fresh pea harvests were made to provide tenderometer readings below 100 at the earliest harvest, near 100 at the middle harvest, and above 100 at the latest harvest. Usually 3 or more harvests were necessary and the interval between harvests was generally 1 or 2 days in each of the 17 experiments. Harvests in the dryland experiments occurred in late June and only rarely in early June, while those under irrigation occurred about 5 days later.

From the data obtained in each experiment, pea yield at 100 tenderometer reading was interpolated. Then the ratio of measured to interpolated yield at 100 tenderometer reading was used to obtain "percent yield" (when multiplied by 100). All percent yields and corresponding tenderometer readings were plotted to obtain a scattergram of percent yield versus tenderometer reading, from which a least squares fit was made using the model: $Y = a + bX + cX^{*}$, where Y is percent yield, X is tenderometer reading; a, b, and c are parameters to be estimated statistically.

Results and Discussion

Six experiments typify green pea development observed in the 17 experiments. They are presented herein (Figs. 1, 2, and 3) because their greater number of harvests more precisely defined trends. These relationships were typical, also, of those found in the literature.

Yields varied from experiment to experiment, but yields within experiments were usually nonlinear functions of time (Fig. 1). In some experiments rates of yield change (change in slope) were positive throughout all harvests, while in others they became negative soon after the harvest series was initiated.

Tenderometer readings increased as a function of time (Fig. 2), but the tenderometer readings increased more rapidly after tenderometer readings had reached 100. An exponentially increasing tenderness function of time was suggested for both dryland and irrigated peas in Fig. 2.

Pea yields are distinctly nonlinear functions of tenderometer reading (Fig. 3). Field to field variation also caused large separation of curves. These 2 features of the yield-tenderness curves emphasize a critical need for comparing experimental yields within an experiment on a common tenderometer rating basis. We have not found a feasible direct adjustment of yields.

Pea yields expressed as a percent of the yield expected at 100 tenderometer are plotted versus tenderometer reading (Fig. 4), and the estimated equations are shown separately for irrigated and

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[2] Associate Professor of Agronomy, Columbia Basin Research Center, and Soil Scientists, Columbia Plateau Conservation Research Center, Pendleton, OR. Appreciation is given to Leslie G. Ekin, Agricultural Research Technician, for expert field assistance given in this study.

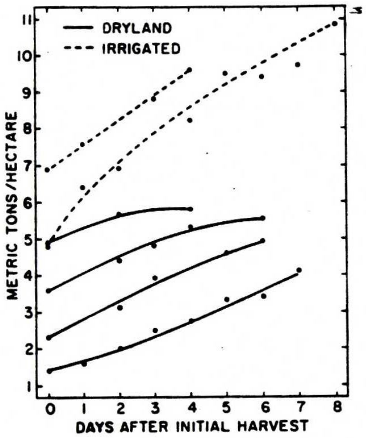

Fig. 1. Yield versus time of harvest for fresh peas in 6 typical experiments.

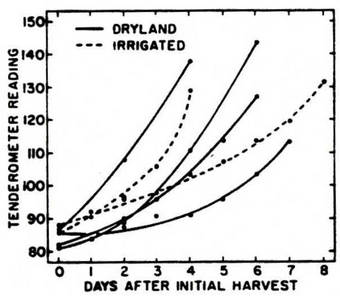

Fig. 2. Tenderometer of fresh peas as affected by time of harvest in 6 typical experiments.

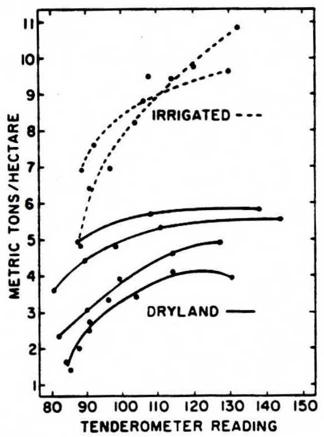

Fig. 3. Yield of fresh peas and associated tenderometer reading in 6 typical experiments.

dryland peas. These equations (Fig. 4) were slightly modified for easy use in adjusting percent yield when tenderometer readings were not 100. The modification involved estimation of Y at 100 tenderometer using equations in Fig. 4. This estimate of Y was then designated as the mean of Y when the mean of X was designated as 100. The equations are shown as follows:

Dryland peas: $(Y-97.21) = -14.134\,(X-100) + 315.14\,(X^{1/2}-10)$

Irrigated peas: $(Y-100.43) = -8.405\,(X-100) + 200.00\,(X^{1/2}-10)$

In these equations, Y is percent yield to be calculated, and X is observed tenderometer reading.

The scatter diagram of Fig. 4 (a composite over the 17 experiments) can be used to adjust yields to a common maturity (100 tenderometer). Such a calibration adjusts for maturity differences. However, the increasing scatter in Fig. 4 as the tenderometer reading deviates from 100 suggests strongly that harvests should be planned to achieve tenderometer readings within the 90 to 110 range. Ordinarily in regression, where the variance of the dependent variable is assumed independent of the independent variable, the precision of predicted dependent variable decreases as the dependent variable becomes larger or smaller than the mean (5). The scatter distribution in Fig. 4 shows a variance dependent on tenderometer reading. We have combined this variance estimate with that of regression in Table 1 to emphasize the true variability characteristics of the calibration in Fig. 4, and the need to plan harvests within the 90 to 110 tenderometer range.

The curves and data points for dryland and irrigated peas were

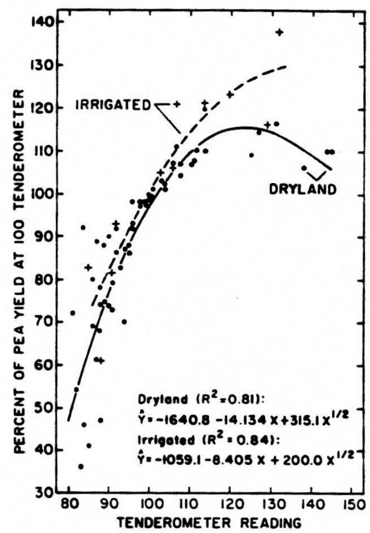

Fig. 4. Percent yield-tenderometer reading relationship for 'Dark Skinned Perfection' pea in irrigated and dryland experiments.

Table 1. Expected random error in estimating a percent-pea-yield at different ranges of tenderometer.[z]

Tenderometer range	$\sigma_{\hat{y}}$	Weighing factor	Estimated true $\sigma_{\hat{y}}$
80-85	8.8[y]	2.1[x]	18.5[w]
85-90	8.7	1.9	16.6
90-95	8.7	0.4	3.5
95-100	8.6	0.4	3.3
100-105	8.6	0.2	1.5
105-110	8.7	0.5	4.5
110-115	8.7	0.5	4.5
115-120	8.8	1.4	12.3

[z] Computations were made using regression composited over irrigated and dryland conditions.

[y] $\sigma_{\hat{y}}$ is the random error expected from multiple regression assuming a variance of y independent of x.

[x] *Weighing factor* is a ratio in which the numerator is the standard error of estimate within the indicated tenderometer range and the denominator is the standard error of estimate for the whole tenderometer range. This ratio approximates the nonuniform variance of percent pea yield at different tenderometer readings.

[w] Estimated true $\sigma_{\hat{y}}$ is the product. (weighing factor) ($\sigma_{\hat{y}}$).

maintained separate in Fig. 4. Above about 110 tenderometer reading the percent yields separate distinctly. This separation of yields indicates a major influence of available soil water on the development of fresh peas in their later stages of growth. We suggest that this factor be carefully evaluated for experiments where irrigation or stored soil water is an experimental variable.

In passing, we note the failure of an appealing normalization procedure involving both yield and tenderometer reading. For each experiment, the maximum and minimum yield or tenderometer readings were noted and the normalized observation computed as $(u-u_{min})/(u_{max}-u_{min})$. The symbol u indicates the variable to be normalized. Nearly the whole range of normalized yield was noted for normalized tenderometer readings <0.5. Furthermore, there was much scatter providing little basis for a calibration.

Norton et al. (4) and Sayre (7) point out that 1 scale is not applicable to all pea cultivars. Norton et al. (4) add that the use of a well-developed scale for 1 cultivar to adjust another cultivar may introduce less error than using a scale developed from only a few points. Information presented in Fig. 4 is consistent with earlier results (1, 2, 4, 7) showing a similar relationship between percent yield and tenderometer readings in the range of 90 to 110. Percent yields changed between 1 and 2 percentage units with each unit change in tenderometer reading.

Experience by the authors indicates that fresh pea yield comparison at a common maturity is essential to good research. Harvesting eac treatment at 2 or more times and interpolating the yield at 1C tenderometer is preferred. When only 1 harvest is possible, yields ca be adjusted to 100 tenderometer by using a percent yield-tenderom eter scale (Fig. 4) which provides more reliable data than merely usin the unadjusted yields.

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