

2023 University of Delaware Snap Bean Variety Trials

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Introduction

The 2023 Snap Bean Variety Trials included twenty-six round-podded varieties and one flat-podded variety from five participating companies. Varieties in the trials are listed below. Round and flat podded varieties were planted in the same trials. The purpose of the trials was to evaluate varieties for yield, quality characteristics, and heat tolerance in a once-over harvest situation.

Round-Podded Varieties Tried in 2023

Name	Entering Company	Name	Entering Company
Peary	HM Clause	SVGG2106	Seminis
HM4423	HM Clause	Tunis (SVGW1203)	Seminis
HMC019396	HM Clause	Antigua	Pure Line
Bass	HM Clause	BB5520	Pure Line
HMC010522	HM Clause	Contada	Pure Line
SB4829	Syngenta	Greenfield	Pure Line
BEX100	Brotherton	RR2015	Pure Line
BEX162	Brotherton	WAV 56	Pure Line
BEX098	Brotherton	Greenback	check (Syngenta)
Jackson	Brotherton	PV857	check (Crites)
BEX175 (flat podded)	Brotherton	Caprice	check (HM Clause)
Nyquist (SVGG2097)	Seminis	HM5101	check (HM Clause)
Dark Horse (SVGG2118)	Seminis	Affirmed	check (Seminis)
SVGF2123	Seminis		

Materials and Methods

Trial Design and Cultural Practices

June-Planted Trial

Location

Field 1 at the University of Delaware Research and Education Center Farm, Georgetown, DE.

Cultural Practices

The first trial was planted on June 2, 2023. Varieties were planted in single-row plots arranged in a randomized complete block design with four replications. Plots were 20 feet long. Border rows of the standard variety ‘Caprice’ were planted on the outside of the plot. Border rows of the standard variety

'Caprice' were planted on the outside of the plot. For round-podded varieties, the seeding rate was 5.15 seeds/foot, for an in-row spacing of 2.3 inches, ~90,000 seeds per acre. Between row spacing was 30 inches. For BEX175, the flat podded variety, the seeding rate was 4.6 seeds/foot, for an in-row spacing of 2.6 inches, ~80,000 seeds per acre. Between row spacing was 30 inches.

The field was fertilized with potassium before planting according to soil test results. An application of 1 pt/A Dual Magnum 15 gpa N SUL 33 (27-0-0-6S) (44 lbs/a of N) was made pre-emergence. The trial was cultivated and sidedressed with 20 gpa N-SUL 33 (58 lb/A of N) in late June. Additional hand weeding was done as necessary. Weed control in the trial was excellent. Asana XL at 10 oz/A was applied on July 14 to control potato leafhopper.

The trial was overhead irrigated as necessary with a traveling linear system.

July-Planted Trial

Location

Field 25B at the University of Delaware Research and Education Center Farm, Georgetown, DE.

Cultural Practices

The second trial was planted on July 14, 2023. The trial design and spacing were the same as for the June-planted trial. Four replications were planted, but only three were harvested because of labor constraints.

The field was fertilized with potassium before planting according to soil test results. An application of 1 pt/A Dual Magnum 15 gpa N SUL 33 (27-0-0-6S) (44 lbs/a of N) was made pre-emergence. The trial was cultivated and sidedressed with 20 gpa N-SUL 33 (58 lb/A of N) in mid-August. Additional hand weeding was done as necessary. Weed control in the trial was good. Bifenthrin at 10 oz/A was applied on August 25 to control stink bugs and other insect pests.

The trial was overhead irrigated as necessary with a traveling linear system.

Plant Measurements

The size of fully mature plants was measured on July 24 for the June-planted trial and on September 5 for the July-planted trial. Plant canopy height and width was measured to the nearest centimeter at a randomly selected location in each replicate.

Harvest Procedures

Round Podded Variety Harvest

Harvest of the June 2-planted trial began on July 21 (49 DAP) and was completed on July 28 (56 DAP). Emergence and stands were excellent or good for most varieties. At harvest, plants were pulled from a 10-foot section of each 20-foot plot. All replications for a variety were harvested on the same day. The harvested plants were weighed to determine fresh biomass. Pods were removed from the plants and weighed to determine yield. A 200 g sub-sample of pods from each replicate was then evaluated for quality based on the USDA standard and graded as U.S. Fancy, U.S. No. 1 or Cull. Fancy and No. 1 grade beans were considered marketable and were further graded by diameter sieve size. The beans in each quality and size grade were weighed. Pod length and seed length was recorded for 10 marketable grade pods.

Harvest of the July 14-planted trial began on September 1 (49 DAP) and was completed on September 8 (56 DAP). Harvest procedures were the same as for the June 2-planted trial.

Flat Podded Variety Harvest

At harvest, plants were pulled from a 10-foot section of each 20-foot plot. All replications for a variety were harvested on the same day. The harvested plants were weighed to determine fresh biomass. Pods were removed from the plants and weighed to determine yield. A 1000 g sub-sample of pods was then evaluated for quality based on the USDA standard and graded as U.S. Fancy, U.S. No. 1 or Cull. Pod length, pod width and length of the center seed was recorded for 10 marketable pods. Pod dimensions were measured with a ruler, seed length with digital calipers.

Results

Yields from the two trials are reported separately in Tables 1 and 2. Figure 1 shows marketable and cull yields from both trials. The percent of yield in each quality grade is reported in Tables 3 and 4. Tables 5 and 6 report the percent of marketable pods in each sieve size and Figure 2 is a chart showing the same data for both trials. Table 7 reports the pod length for each variety for both trials. Table 8 reports the seed length of marketable pods for both trials. Table 9 reports plant height and width for both trials.

Figures 3 and 4 are charts showing high and low temperatures and rainfall for each trial.

Figure 5 is a photo of the June 2-planted trial on the first day of harvest.

Discussion

The first trial (Jun 2) had excellent emergence and stand establishment for most varieties. There were significant differences in percent stand among the varieties (Table 1), however total yield was only weakly correlated with percent stand (R^2 value = 0.22). Plants in this trial grew well and filled or nearly filled the row middles (Table 9, Figure 5) with an average height of 48 cm and average width of 53 cm. Weeds were well controlled. This trial experienced sustained heat stress during the flowering period. The first open flowers were observed on July 6. Daily lows were at or above 68 °F for a 21-day period (Figure 3) starting on July 1 and ending on July 21, which was the first day of harvest. High night temperatures (above 68°F) in the bud development and flowering stage cause poor pollination which results in poor pod set and misshapen pods.

The varieties with the highest marketable yield in the June-planted trial were PV857, SB4829, BEX175, Greenback, BB5520, Nyquist, BEX100, RR2015, SVGF2123, and HM5101. All of these varieties produced significantly higher marketable yields than the standard variety Caprice. PV857 has performed well in many past heat-stressed trials in Delaware. BEX175 was previously tested in the 2020 trials, where it produced moderate yields under heat stress. All the other top yielding varieties are new to the Delaware trials. A high percentage of marketable pods is also a helpful indicator of heat stress tolerance. Greenback, SVGF2123, PV857, Nyquist and Dark Horse had the highest percent marketable pods, ranging from 81 to 93% marketable. Caprice produced only 64% marketable pods in this trial.

Overall, marketable yields were higher in the second trial (6,294 lbs/a) than in the first trial (5,100 lbs/a). The second trial (Jun 14) had lower average stands than the first trial, with an overall average of 61% compared to 72% in the first trial. This may have been the result of heavy rain that occurred soon after planting. Because of stand loss, weeds were not as well controlled as the first trial. There were statistically significant differences in stand between the varieties (Table 2). Total yield was more strongly correlated with percent stand (R^2 value = 0.38) than the first trial. Average plant height and width was slightly larger in the second trial, compared to the first trial. The second trial experienced moderate heat stress during the

bud formation and flowering period. The first open flowers were observed on August 17. Night temperatures were above 68 °F on eight of the ten days prior to August 17. From August 17 to August 27 (11 days), four nights were above 68 °F.

The varieties with the highest marketable yield in the second trial were PV857, SVGF2123, and SB4829. These varieties also performed well in the first trial. Only PV857 and SVGF2123 produced significantly higher yields than Caprice in the second trial.

Varieties with high yields in both trials were PV857, SVGF2123, SB4829, Nyquist, BEX175, RR2015 and BB5520.

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Table 1. June 2 Planted Trial: Days to Harvest, % Stand; Total and Marketable Yields; Percent Marketable; Seed Length

Variety	Days to Harvest	% Stand	Total Yield (lbs/acre)	Marketable Yield (lbs/acre)	Percent Marketable	Seed Length (mm)
PV857	49	83.6 abc	10,975 ab	9,027 a	83.6 abc	7.65 fgh
SB4829	52	76.8 cde	11,322 ab	8,702 ab	76.8 cde	7.07 hijk
BEX175	55	63.9 fhi	13,349 a	8,657 ab	63.9 ghi	9.00 bc
Greenback	52	92.7 a	9,191 bcde	8,517 ab	92.7 a	6.61 jkl
BB5520	55	81.3 bcd	10,276 bc	8,329 ab	81.3 bcd	9.14 b
Nyquist	53	83.5 abc	9,776 bc	8,224 ab	83.5 abc	7.77 fgh
BEX100	54	81.3 bcd	9,450 bcd	7,807 ab	81.3 bcd	8.29 cdef
RR2015	53	80.7 cd	9,527 bcd	7,703 ab	80.7 cd	6.26 l
SVGF2123	54	92.0 ab	8,125 cdef	7,503 ab	92.0 ab	7.11 hijk
HM5101	55	78.9 cd	9,008 bcde	7,149 abc	78.9 cd	7.93 defg
HM4423	53	66.1 efghi	9,930 bc	6,572 bcd	66.1 efghi	7.76 fgh
Dark Horse	53	81.8 abcd	6,271 fghi	5,192 cde	81.8 abcd	7.35 ghij
HMC010522	52	72.3 defg	6,694 efgh	4,846 def	72.3 defg	6.53 kl
Caprice	54	64.3 fghi	7,145 defg	4,596 def	64.3 fghi	7.42 ghi
Bass	55	60.8 hij	6,694 efgh	4,436 defg	60.8 hij	7.91 efg
Affirmed	56	80.7 cd	4,849 ghijklm	3,926 efgh	80.7 cd	6.51 kl
SVGG2106	54	67.5 efgh	5,685 fghijk	3,859 efghi	67.5 efgh	8.71 bcd
Jackson	53	67.6 efgh	5,148 ghijkl	3,603 efghi	67.6 efgh	6.75 ijkl
BEX098	56	75.0 cdef	4,082 hijklm	3,111 efghij	75.0 cdef	9.07 bc
Peary	53	51.4 j	5,858 fghij	3,008 efghij	51.4 j	7.47 ghi
Antigua	56	73.1 cdefg	3,960 ijklm	3,003 efghij	73.1 cdefg	6.58 jkl
BEX162	56	81.3 bcd	3,495 jklmn	2,843 fghijk	81.3 bcd	6.82 ijkl
WAV 56	55	72.7 cdefg	3,063 klmn	2,210 ghijk	72.7 cdefg	8.66 bcde
Greenfield	56	64.8 fghi	2,567 lmn	1,658 hijk	64.8 fghi	10.09 a
Contada	55	51.8 j	3,189 klmn	1,603 ijk	51.8 j	6.45 kl
HMC019396	55	39.1 k	2,497 mn	959 jk	39.1 k	4.78 m
Tunis	56	55.2 ij	1,195 n	658 k	55.2 ij	6.16 l
<i>p-value</i>		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Fisher's LSD ¹		14.52	2629	2287	10.885	t-group
C.V.		12.4	27.5	31.9	10.8	24.2

¹Means followed by the same letter are not significantly different according to Fisher's LSD.

Table 2. July 14 Planted Trial: Days to Harvest, % Stand; Total and Marketable Yields; Percent Marketable; Seed Length

Variety	Days to Harvest	% Stand	Total Yield (lbs/acre)	Marketable Yield (lbs/acre)	Percent Marketable	Seed Length (mm)
PV857	49	72.1 abcd	13,982 a	11,215 a	82.2 abc	8.07 fhij
SVGF2123	54	69.2 abcd	12,574 abc	9,985 ab	80.2 abcd	7.70 hijk
SB4829	49	85.3 a	11,242 abcde	8,895 abc	78.8 abcd	8.06 ghij
BEX175	56	71.0 abcd	12,984 ab	8,438 bcd	64.4 efghi	10.16 ab
Nyquist	54	55.1 cdef	10,218 bcdef	8,388 bcd	81.9 abc	8.82 defg
RR2015	53	51.3 defg	11,281 abcde	7,470 bcde	63.3 fghi	7.40 ijkl
SVGG2106	55	65.4 abcde	10,013 bcdef	7,170 cdef	71.3 cdef	8.39 efgh
Dark Horse	55	69.9 abcd	10,192 bcdef	7,151 cdef	71.2 cdef	8.35 efgh
BB5520	53	51.3 defg	10,039 bcdef	7,062 cdef	70.6 cdefg	9.68 bcd
HM4423	54	78.9 abc	11,754 abcd	6,641 cdefg	56.4 hi	10.01 bc
Caprice	53	66.7 abcde	11,229 abcde	6,557 cdefg	58.4 ghi	6.98 kl
HMC010522	56	56.4 bcdef	8,156 efghi	6,304 cdefg	77.0 abcde	9.09 def
Contada	55	79.5 ab	9,450 cdefg	6,118 defg	64.6 efghi	7.43 ijkl
Antigua	55	71.2 abcd	8,630 defgh	6,100 defg	71.0 cdefg	6.80 l
WAV 56	56	85.3 a	10,244 bcdef	5,984 defg	58.5 ghi	8.95 defg
Greenback	49	30.8 g	6,492 ghi	5,782 defg	89.4 a	7.33 ijkl
BEX100	55	51.3 defg	8,745 defgh	5,427 efg	62.0 fghi	9.24 cde
Peary	53	66.7 abcde	9,936 bcdef	5,421 efg	53.4 i	8.20 fghij
HM5101	49	43.6 efg	6,364 ghi	5,403 efg	85.9 ab	6.59 l
BEX162	55	67.3 abcde	7,939 efghi	5,142 efg	62.0 fghi	7.31 jkl
Jackson	56	56.4 bcdef	7,824 fghi	4,915 efg	61.7 fghi	10.06 abc
BEX098	54	43.6 efg	7,657 fghi	4,846 efg	63.9 fghi	7.89 hij
Tunis	55	77.6 abc	7,401 fghi	4,732 fg	64.2 fghi	6.55 l
Greenfield	56	61.5 abcdef	6,364 ghi	4,572 fg	73.4 bcdef	9.33 bcd
Bass	56	51.3 defg	8,131 efghi	4,503 fg	55.2 i	10.94 a
Affirmed	55	37.8 fg	5,928 hi	4,011 gh	68.4 defgh	8.25 fghi
HMC019396	56	38.5 fg	4,904 i	1,705 h	33.6 j	7.31 ijkl
<i>p-value</i>		<i>0.0003</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>
Fisher's LSD ¹		24.05	3351	2669	12.68	t-group
C.V.		23.95	22.1	25.9	11.5	21.3

¹Means followed by the same letter are not significantly different according to Fisher's LSD.

Table 3. June 2 Planted Trial: Percent of Yield in Each Quality Grade

Variety	% Marketable	% Fancy	% No. 1
Greenback	92.7 a	41.2 ab	51.5 ab
SVGF2123	92.0 ab	38.2 abc	53.8 a
PV857	83.6 abc	35.6 abc	48.0 abcde
Nyquist	83.5 abc	39.9 abc	43.6 bcdefgh
Dark Horse	81.8 abcd	39.6 abc	42.2 bcdefgh
BB5520	81.3 bcd	39.0 abc	42.3 bcdefgh
BEX162	81.3 bcd	42.2 a	39.1 defghi
BEX100	81.3 bcd	31.6 abcde	49.7 abc
RR2015	80.7 cd	34.5 abc	46.2 abcdefg
Affirmed	80.7 cd	31.4 bcde	49.2 abcd
HM5101	78.9 cd	39.0 abc	39.8 cdefghi
SB4829	76.8 cde	38.4 abc	38.5 efghi
BEX098	75.0 cdef	38.9 abc	36.1 ghi
Antigua	73.1 cdefg	22.8 def	50.3 ab
WAV 56	72.7 cdefg	29.8 cde	43.0 bcdefgh
HMC010522	72.3 defg	32.8 abcd	39.5 cdefghi
Jackson	67.6 efgh	30.1 cde	37.5 fghi
SVGG2106	67.5 efgh	23.2 def	44.3 abcdefgh
HM4423	66.1 efghi	22.0 ef	44.0 abcdefgh
Greenfield	64.8 fghi	21.9 ef	42.9 bcdefgh
Caprice	64.3 fghi	16.8 f	47.5 abcdef
BEX175	63.9 ghi	17.3 f	46.6 abcdef
Bass	60.8 hij	31.0 bcde	29.8 ij
Tunis	55.2 ij	17.9 f	37.3 fghi
Contada	51.8 j	21.1 ef	30.7 ij
Peary	51.4 j	16.3 f	35.1 hij
HMC019396	39.1 k	13.5 f	25.6 j
<i>p-value</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>
Fisher's LSD¹	10.89	10.73	10.23
Coefficient of Variation	10.76	25.53	17.29

¹Means followed by the same letter are not significantly different according to Fisher's LSD.

Table 4. July 14 Planted Trial: Percent of Yield in Each Quality Grade

Variety	% Marketable	% Fancy	% No. 1
Greenback	89.4 a	35.2 abcde	54.2 a
HM5101	85.9 ab	39.1 ab	46.8 abc
PV857	82.2 abc	37.4 abc	44.8 abcd
Nyquist	81.9 abc	32.2 abcdef	49.7 ab
SVGF2123	80.2 abcd	32.5 abcdef	47.6 abc
SB4829	78.8 abcd	41.2 a	37.6 bcde
HMC010522	77.0 abcde	37.2 abc	39.8 abcd
Greenfield	73.4 bcdef	24.4 bcdefg	48.9 abc
SVGG2106	71.3 cdef	36.2 abcd	35.1 bcde
Dark Horse	71.2 cdef	31.8 abcdef	39.4 bcde
Antigua	71.0 cdefg	22.0 defgh	49.0 abc
BB5520	70.6 cdefg	34.7 abcdef	35.9 bcde
Affirmed	68.4 defgh	26.0 bcdefg	42.4 abcd
Contada	64.6 efghi	21.2 efgh	43.5 abcd
BEX175	64.4 efghi	16.1 gh	48.3 abc
Tunis	64.2 fghi	28.1 abcdef	36.0 bcde
BEX098	63.9 fghi	22.0 defgh	41.9 abcd
RR2015	63.3 fghi	16.8 gh	46.5 abc
BEX100	62.0 fghi	24.1 cdefg	37.9 bcde
BEX162	62.0 fghi	37.0 abc	24.9 e
Jackson	61.7 fghi	15.2 gh	46.5 abc
WAV 56	58.5 ghi	24.1 cdefg	34.3 cde
Caprice	58.4 ghi	23.1 cdefgh	35.2 bcde
HM4423	56.4 hi	20.0 fgh	36.4 bcde
Bass	55.2 i	16.1 gh	39.1 bcde
Peary	53.4 i	21.9 defgh	31.4 de
HMC019396	33.6 j	8.6 h	25.0 e
<i>p-value</i>	<i><0.0001</i>	<i>0.0009</i>	<i>0.0151</i>
Fisher's LSD¹	12.67	14.81	14.66
Coefficient of Variation	11.46	33.7	22

¹Means followed by the same letter are not significantly different according to Fisher's LSD.

Table 5. June 2 Planted Trial: Varieties by Percent of Marketable Pods in Each Diameter Size Grade

Variety	% Grade 2	% Grade 3	% Grade 4	% Grade 5	Seed Length (mm)
Peary	1.6 c	6.9 jkl	36.4 fghi	55.1 ab	7.47 ghi
HM4423	2.8 c	14.0 ijkl	42.2 defgh	41.0 abcd	7.76 fgh
HMC019396	10.9 a	55.5 b	27.0 hi	6.6 f	4.78 m
Bass	1.2 c	41.0 bcde	53.0 bcdefg	4.8 f	7.91 efg
HMC010522	2.4 c	77.9 a	19.7 i	0.0 f	6.53 kl
SB4829	1.0 c	45.3 bcd	41.6 defgh	12.2 f	7.07 hijk
BEX100	3.2 bc	32.4 cdefgh	53.6 bcdef	10.8 f	8.29 cdef
BEX162	0.0 c	36.5 cdef	60.0 abcd	3.5 f	6.82 ijkl
BEX098	0.0 c	12.8 ijkl	57.4 bcde	29.8 de	9.07 bc
Jackson	0.0 c	18.6 ghijkl	66.8 abc	14.6 ef	6.75 ijkl
Nyquist	0.6 c	12.7 ijkl	50.6 bcdefg	36.1 cd	7.77 fgh
Dark Horse	0.6 c	3.4 l	53.5 bcdef	42.6 abcd	7.35 ghij
SVGF2123	3.0 bc	8.3 ijkl	47.4 cdefgh	41.3 abcd	7.11 hijk
SVGG2106	2.7 c	23.2 fghij	60.6 abcd	13.5 ef	8.71 bcd
Tunis	0.0 c	45.6 bcd	54.5 bcdef	0.0 f	6.16 l
Greenback	1.1 c	34.4 cdefg	48.0 cdefg	16.5 ef	6.61 jkl
PV857	1.1 c	28.8 defghi	57.7 bcde	12.4 f	7.65 fgh
Caprice	2.9 c	7.1 jkl	32.6 ghi	57.5 a	7.42 ghi
HM5101	1.2 c	21.8 fghijk	38.0 efghi	39.0 bcd	7.93 defg
Affirmed	0.0 c	16.6 hijkl	78.9 a	4.5 f	6.51 kl
Antigua	0.0 c	41.5 bcde	57.4 bcde	1.1 f	6.58 jkl
BB5520	0.0 c	4.5 kl	48.2 cdefg	47.3 abc	9.14 b
Contada	7.2 ab	46.5 bcd	45.5 defgh	0.8 f	6.45 kl
Greenfield	0.0 c	49.4 bc	49.0 bcdefg	1.6 f	10.09 a
RR2015	3.3 bc	16.4 hijkl	35.6 fghi	44.8 abcd	6.26 l
WAV 56	1.3 c	24.3 efghij	69.4 ab	5.1 f	8.66 bcde
p-value	0.0005	<0.0001	<0.0001	<0.0001	<0.0001
Fisher's LSD¹	4.23	17.72	20.59	16.92	t-group
C.V.	162.22	45.12	29.59	57.56	24.16

¹Means followed by the same letter are not significantly different according to Fisher's LSD.

Table 6. July 14 Planted Trial: Varieties by Percent of Marketable Pods in Each Diameter Size Grade

Variety	% Grade 2	% Grade 3	% Grade 4	% Grade 5	Seed Length (mm)
Peary	1.7 c	7.9 ijk	19.7 gh	70.8 a	8.20 fghij
HM4423	0.0 c	8.4 ijk	43.5 def	48.1 bc	10.01 bc
HMC019396	11.9 a	50.4 bcde	37.7 efg	0.0 i	7.31 ijkl
Bass	4.2 bc	67.4 ab	28.4 fg	0.0 i	10.94 a
HMC010522	9.5 ab	88.3 a	2.2 h	0.0 i	9.09 def
SB4829	1.5 c	43.2 cdef	48.4 cdef	7.0 hi	8.06 ghij
BEX100	0.0 c	37.5 cdefg	58.9 bcde	3.6 i	9.24 cde
BEX162	4.7 bc	42.7 cdef	43.5 def	9.1 ghi	7.31 jkl
BEX098	1.8 c	14.9 hijk	49.4 cdef	33.9 cd	7.89 hij
Jackson	1.2 c	50.6 bcde	48.3 cdef	0.0 i	10.06 abc
Nyquist	0.0 c	26.2 fghij	57.6 bcde	16.2 efghi	8.82 defg
Dark Horse	0.7 c	26.0 fghij	70.0 bc	3.4 i	8.35 efgh
SVGF2123	0.0 c	12.6 ijk	63.4 bcd	24.0 defgh	7.70 hijk
SVGG2106	1.6 c	35.9 defgh	57.3 bcde	5.3 i	8.39 efgh
Tunis	1.8 c	58.7 bc	36.5 efg	3.0 i	6.55 l
Greenback	3.0 c	44.2 cdef	42.6 defg	10.2 fghi	7.33 ijkl
PV857	2.7 c	36.3 cdefgh	45.4 def	15.7 efghi	8.07 fhij
Caprice	1.4 c	12.1 ijk	58.4 bcde	28.1 de	6.98 kl
HM5101	1.1 c	19.7 fhijk	53.8 bcde	25.4 defg	6.59 l
Affirmed	2.5 c	22.1 fghijk	48.6 cdef	26.8 def	8.25 fghi
Antigua	0.0 c	29.8 efghi	54.9 bcde	15.3 efghi	6.80 l
BB5520	0.0 c	10.6 ijk	36.7 efg	52.7 b	9.68 bcd
Contada	3.1 c	52.6 bcd	41.1 defg	3.2 i	7.43 ijkl
Greenfield	0.0 c	24.8 fghijk	75.2 ab	0.0 i	9.33 bcd
RR2015	0.0 c	6.1 jk	45.7 def	48.2 bc	7.40 ijkl
WAV 56	0.0 c	2.9 k	97.1 a	0.0 i	8.95 defg
<i>p-value</i>	<i>0.0049</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>	<i><0.0001</i>
Fisher's LSD¹	5.33	22.49	23.74	17.44	t-group
C.V.	156.0	42.9	29.8	61.4	21.3

¹Means followed by the same letter are not significantly different according to Fisher's LSD.

Table 7. Pod Length in Centimeters of Marketable Pods for Both Trials and Overall Average

Variety	Jun 2 Trial Pod Length (cm)	Jul 14 Trial Pod Length (cm)	Overall Average Pod Length (cm)
BEX175 (flat)	15.6 a	15.4 a	15.5
BEX098	13.4 b	14.0 bc	13.7
Greenback	13.0 bcde	14.2 b	13.6
Affirmed	13.1 bcd	14.1 b	13.6
BB5520	12.8 cdef	13.9 bcd	13.3
Jackson	12.8 cdef	13.8 bcd	13.3
Greenfield	13.2 bc	13.4 cde	13.3
HM5101	13.2 bc	13.4 cde	13.3
SVGF2123	13.0 bcd	13.1 ef	13.0
Nyquist	12.9 cdef	13.1 ef	13.0
PV857	13.0 bcd	12.9 efg	12.9
RR2015	12.5 efgh	13.3 de	12.9
BEX100	12.6 defg	13.2 ef	12.9
Caprice	12.8 cdef	12.7 fgh	12.7
HM4423	11.7 i	13.1 ef	12.4
Dark Horse	12.4 fgh	12.1 hi	12.3
BEX162	12.4 fgh	12.1 hi	12.3
Peary	11.6 i	12.9 efg	12.2
WAV 56	12.1 ghi	12.1 hi	12.1
SVGG2106	12.0 hi	12.1 hi	12.0
Bass	10.7 jkl	12.7 fgh	11.7
SB4829	11.0 jk	12.4 gh	11.7
HMC019396	10.4 lm	12.8 efg	11.6
HMC010522	10.7 jkl	12.4 gh	11.5
Antigua	11.1 j	11.6 ij	11.3
Contada	10.5 kl	11.4 k	11.0
Tunis	9.9 m	10.3 k	10.1
<i>p-value</i>	<i><0.0001</i>	<i><0.0001</i>	
Means Separation	t-group	t-group	
C.V.	9.7	9.2	

Table 8. Seed Length in Millimeters from Marketable Pods for Both Trials and Overall Average

Variety	Jun 2 Trial Seed Length (mm)	Jul 14 Trial Seed Length (mm)	Overall Average Seed Length (mm)
Greenfield	10.09 a	9.33 bcd	9.7
Bass	7.91 efg	10.94 a	9.4
BB5520	9.14 b	9.68 bcd	9.4
HM4423	7.76 fgh	10.01 bc	8.9
WAV 56	8.66 bcde	8.95 defg	8.8
BEX100	8.29 cdef	9.24 cde	8.8
SVGG2106	8.71 bcd	8.39 efgh	8.6
BEX098	9.07 bc	7.89 hij	8.5
Jackson	6.75 ijkl	10.06 abc	8.4
Nyquist	7.77 fgh	8.82 defg	8.3
PV857	7.65 fgh	8.07 fhij	7.9
Dark Horse	7.35 ghij	8.35 efgh	7.8
Peary	7.47 ghi	8.20 fghij	7.8
HMC010522	6.53 kl	9.09 def	7.8
SB4829	7.07 hijk	8.06 ghij	7.6
SVGF2123	7.11 hijk	7.70 hijk	7.4
Affirmed	6.51 kl	8.25 fghi	7.4
HM5101	7.93 defg	6.59 l	7.3
Caprice	7.42 ghi	6.98 kl	7.2
BEX162	6.82 ijkl	7.31 jkl	7.1
Greenback	6.61 jkl	7.33 ijkl	7.0
Contada	6.45 kl	7.43 ijkl	6.9
RR2015	6.26 l	7.40 ijkl	6.8
Antigua	6.58 jkl	6.80 l	6.7
Tunis	6.16 l	6.55 l	6.4
HMC019396	4.78 m	7.31 ijkl	6.0
<i>p-value</i>	<i><0.0001</i>	<i><0.0001</i>	
Means Separation	t-group	t-group	
C.V.	24.2	21.3	

Table 9. Plant Height and Width in Centimeters for Both Trials and Overall Average

	Jun 2 Trial		Jul 14 Trial		Overall	
Variety	Height (cm)	Width (cm)	Height (cm)	Width (cm)	Height	Width
Greenfield	54 abc	51 cdefg	60 ab	69 a	56.8	60.1
BEX162	52 abcd	54 bcdefg	65 a	62 a	58.7	57.8
RR2015	54 abc	66 a	49 defg	64 a	51.4	65.0
BEX175	51 abcde	61 ab	58 abc	62 a	54.3	61.5
Caprice	54 abc	55 bcdefg	52 bcdefg	66 a	52.8	60.3
SVGF2123	50 abcdefg	55 bcdefg	56 bcde	61 a	52.8	58.2
BEX098	57 a	59 abc	54 bcdef	51 a	55.3	55.2
BEX100	47 cdefgh	59 abc	53 bcdef	62 a	50.0	60.3
SVGG2106	48 bcdefgh	54 bcdefg	57 abcd	60 a	52.5	57.0
Nyquist	50 abcdefg	56 bcdefg	49 defg	66 a	49.4	60.6
HM4423	47 cdefgh	54 bcdefg	53 bcdef	62 a	50.3	58.0
Peary	50 abcdef	55 bcdefg	51 cdefg	59 a	50.6	56.9
SB4829	45 defgh	58 abcd	49 defg	64 a	47.3	60.8
HM5101	55 ab	57 abcde	48 efgh	53 a	51.4	55.1
Affirmed	49 abcdefg	55 bcdefg	52 cdefg	56 a	50.5	55.4
Dark Horse	46 cdefgh	47 fg	54 bcde	62 a	50.3	54.6
WAV 56	47 cdefgh	49 defg	58 abc	53 a	52.3	51.0
Greenback	50 abcdefg	56 bcdef	49 defg	51 a	49.7	53.5
BB5520	50 abcdefg	56 bcdef	51 cdefg	46 a	50.5	51.0
HMC010522	45 efgh	48 fg	51 cdefg	58 a	47.8	52.8
Antigua	47 cdefgh	47 g	54 bcdef	53 a	50.2	49.9
Bass	46 cdefgh	51 cdefg	45 gh	59 a	45.5	54.7
Jackson	43 gh	50 cdefg	49 efgh	58 a	45.7	54.0
PV857	44 fgh	49 efg	48 efgh	58 a	45.8	53.4
Tunis	41 h	48 efg	58 abc	50 a	49.3	49.0
Contada	43 gh	47 fg	46 fgh	52 a	44.4	49.2
HMC019396	44 fgh	46 g	41 h	55 a	42.1	50.6
<i>p-value</i>	<i>0.0017</i>	<i>0.0033</i>	<i>0.0002</i>	<i>0.0888</i>		
Fisher's LSD¹	7.4	9.5	8.1	NA		
C.V.	10.9	12.6	9.5	13.5		

¹Means followed by the same letter are not significantly different according to Fisher's LSD.

Figure 1. Chart showing total and marketable yield in lbs/acre for the June 2 and July 14 planted trials.

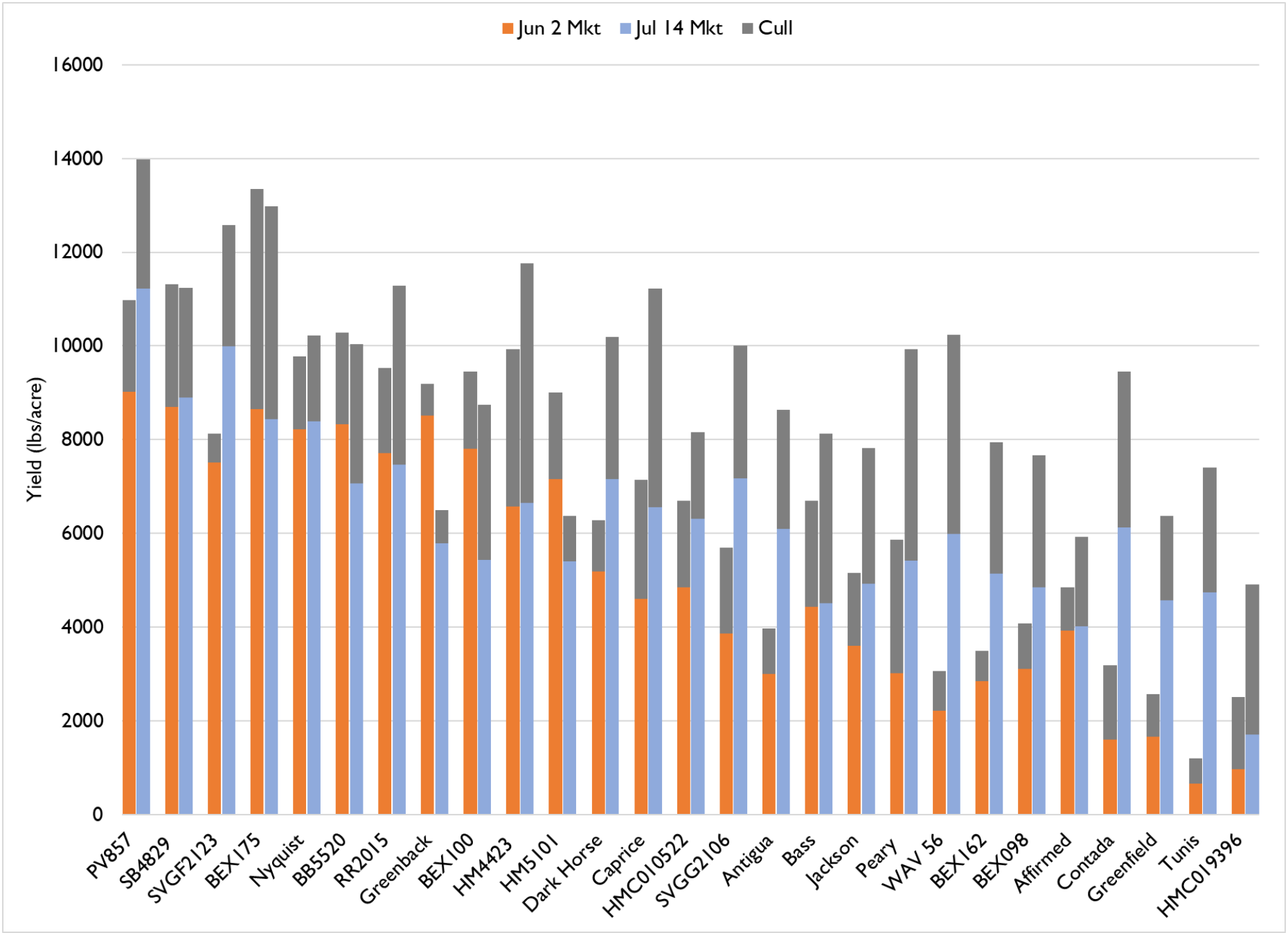


Figure 2. Chart showing percent of harvest in each diameter size grade for round podded varieties in the June 2 (left column) and July 14 (right column) trials.

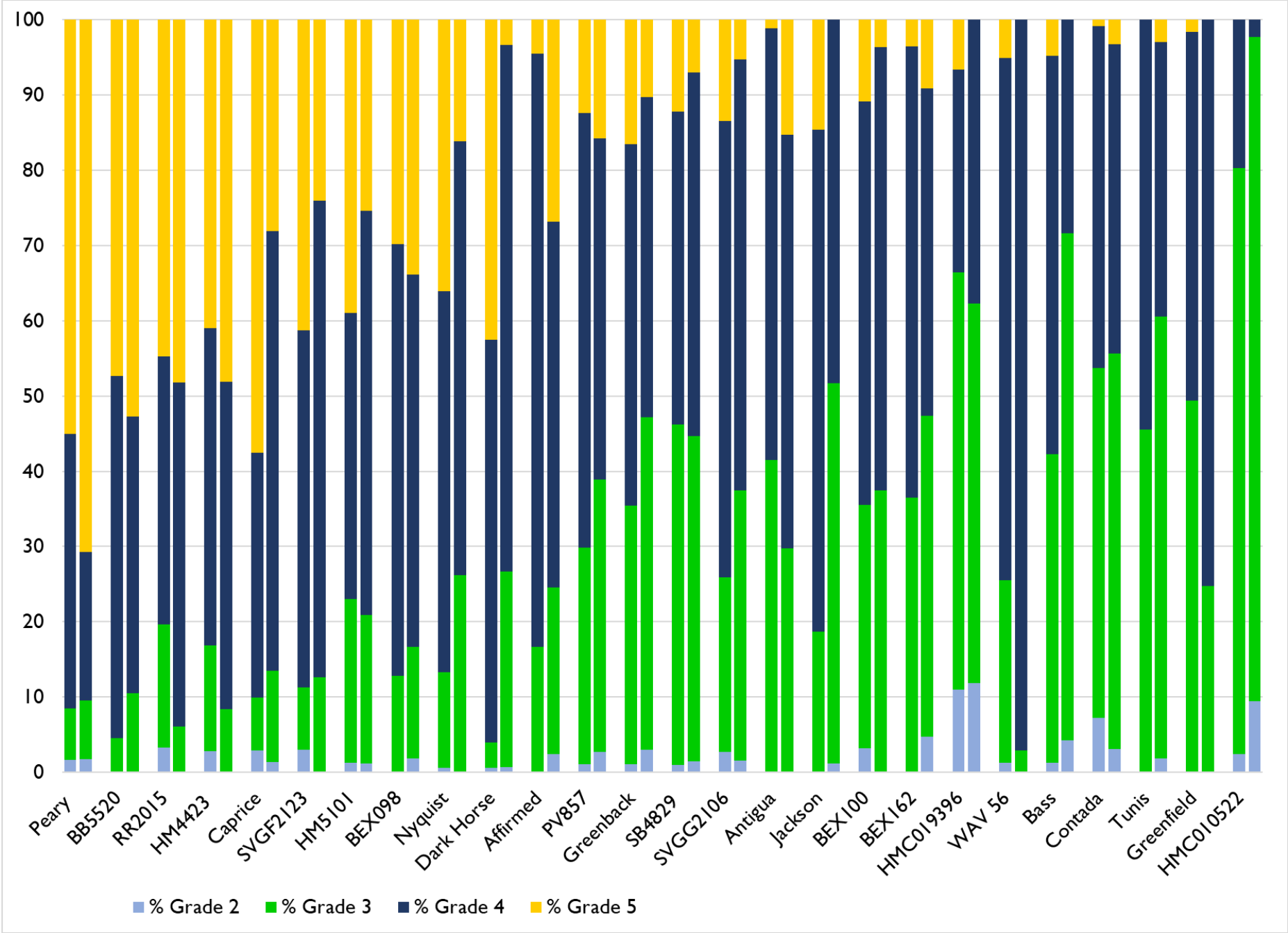


Figure 3. Temperature and Rainfall for the June 2 Planted Round Snap Bean Trial from June 2 (planting) July 28 (final harvest)

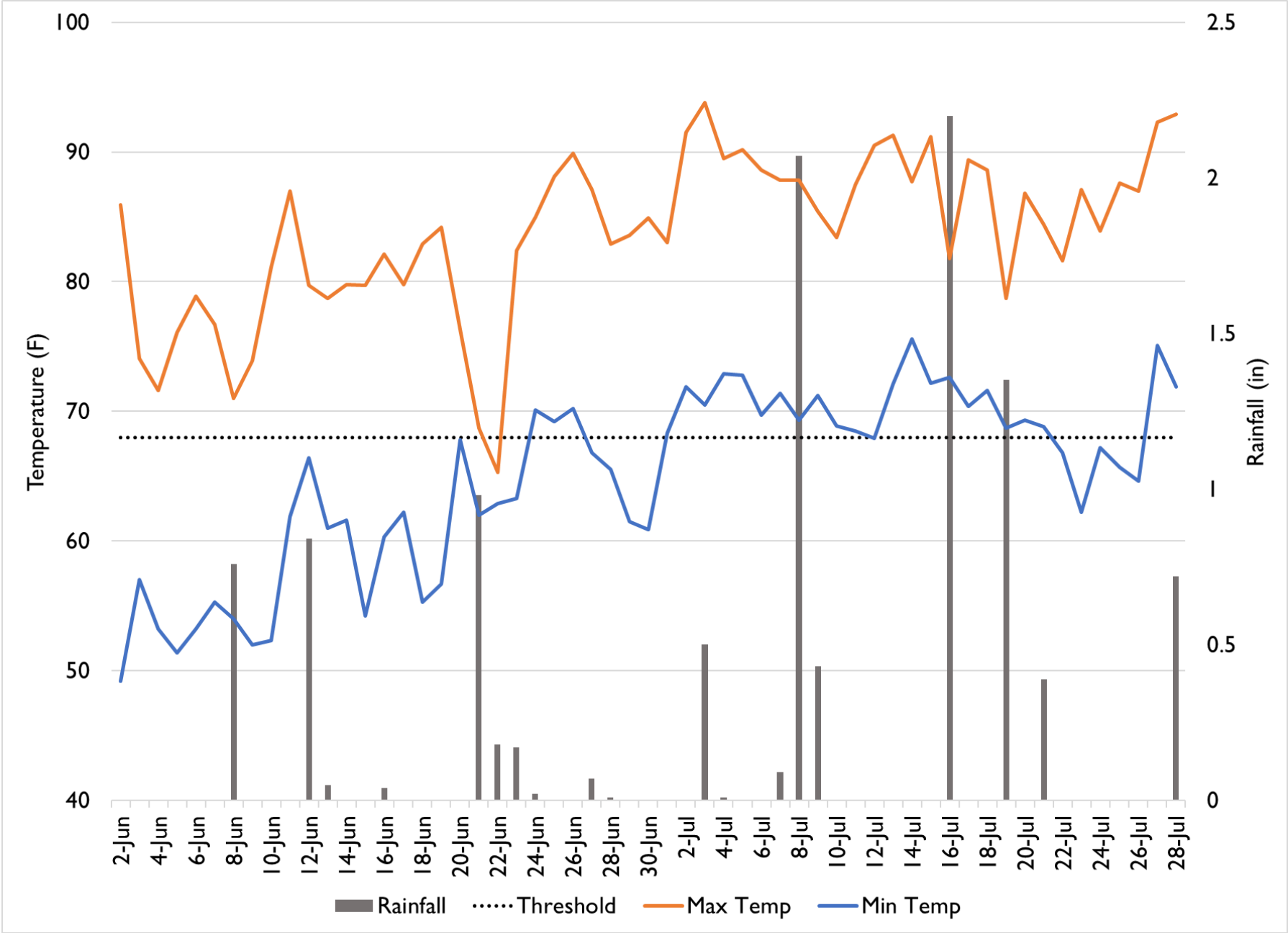


Figure 4. Temperature and Rainfall for the July 14 Snap Bean Trial from July 14 (planting) September 8 (final harvest)

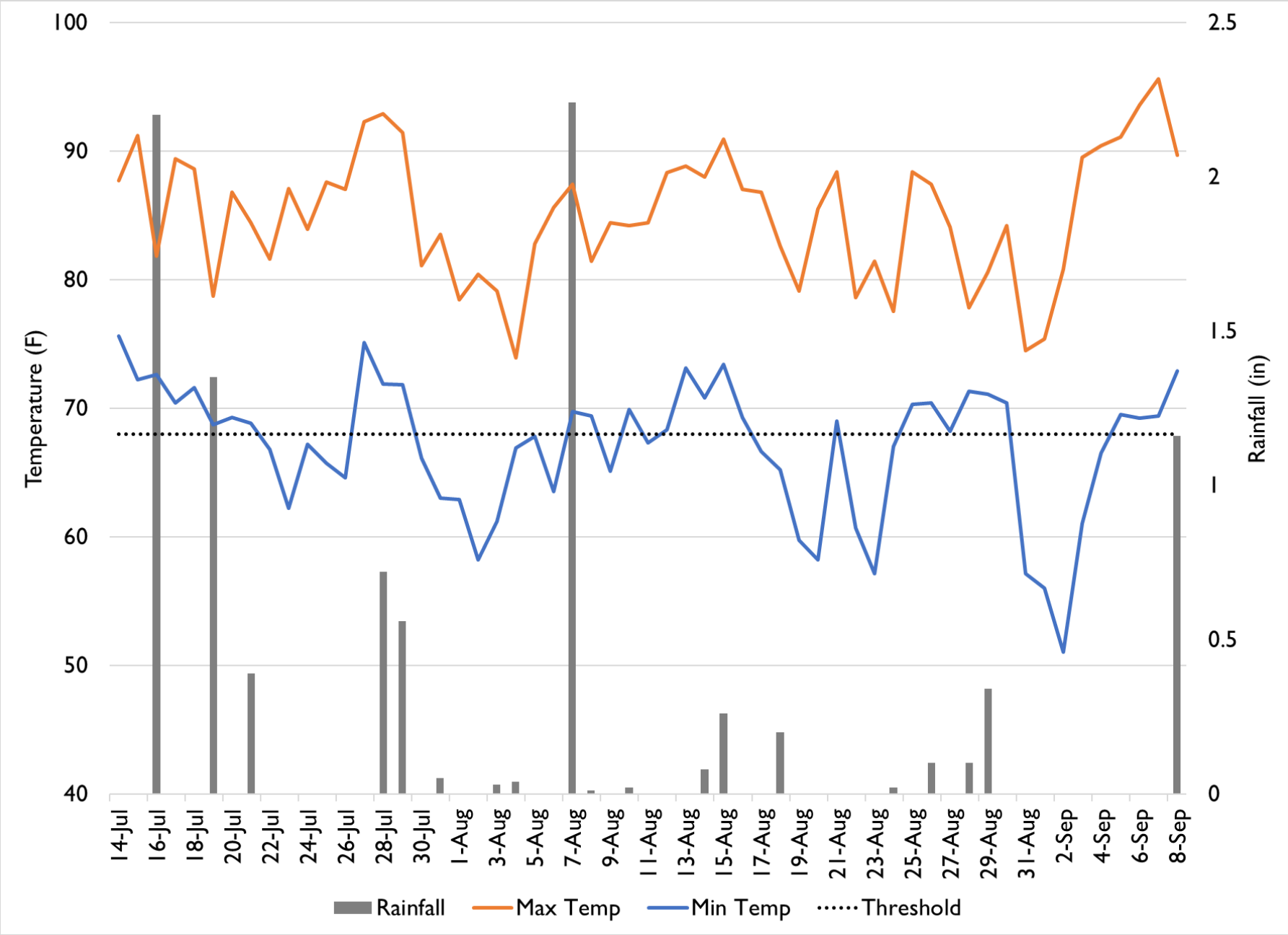


Figure 5. June 2 planted trial on July 21, 2023, 49 DAP, the first day of harvest.

