



Mini Seedless Watermelon Variety Trial Results 2018

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2018 University of Delaware Mini Seedless Watermelon Variety Trial

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Introduction

The 2018 Mini Seedless Watermelon Variety Trial included 12 varieties from five participating companies. The purpose of this trial was to evaluate seedless mini watermelon varieties for yield and quality for late summer and early fall harvest.

Materials and Methods

Trial Design

The trial was a Randomized Complete Block with 3 replications. Plots were 1 row, 30' in length.

Location and Soil Type

Field 12 D, University of Delaware Thurman Adams Research Farm, Carvel Research and Education Center, Georgetown, Delaware. The soil type was a Hammonton Loamy Sand.

Cultural Practices

The field was fertilized and limed according to soil test results. Preplant fertilizer was 50-0-160-72 (N-P₂O₅-K₂O-S). Black plastic mulch and trickle irrigation were laid on 7' centers. Additional nitrogen fertilizer was applied by fertigation during fruiting in three applications three weeks apart (40, 40, 30 lbs/a N).

Trial entries are listed in Table 1. Entries were seeded in the greenhouse on May 26, 2018. Plants were transplanted to the field on June 22, 2018. Field plots were one row (7 ft) wide and 30 ft long. Plots were arranged in a randomized complete block design with three replications. In-row spacing for seedless plants was 2 ft with 15 plants per plot. Six pollinizer plants, three each of the in-row pollinizer varieties 110 WC and Minipol, were planted in each plot and one between plots in the following arrangement: s 1 s s s M s s s 1 s s s M s s s 1 s s M. "1" designates "110 WC", M designates "Minipol", and "s" designates the seedless plants. The border rows next to the drive rows, which separated the replications, were planted in the triploid variety 'Wayfarer', with the same pollinizers, in the same arrangement as the experimental plots.

Herbicides used in row middles prior to planting included Sinbar-2 oz/A, Prowl- 2.1 pt/A, Strategy- 2 pt/A, and Dual- 1 pt/A. Additional herbicide was applied with a shielded sprayer on the week of 7-1-18 Gramoxone 2 qt/A, Reflex 12 oz/A, Herbimax 1% v/v. Planting holes were hand weeded.

A comprehensive disease, insect and mite control program was used for the trial as follows:
7-1-18: Bravo 3 pt/A, Inspire Super 16 oz/A, Reaper 8 oz/A, Assail 4 oz/A, Mastercop 1 pt/A, Select 1 pt/A

7-10-18: Bravo 3 pt/A, Inspire Super 16 oz/A, Reaper 8 oz/A, Assail 4 oz/A, Mastercop 1 pt/A,
7-18-18: Bravo 3 pt/A, Inspire Super 16 oz/A, Portal 1 qt/A, Assail 4 oz/A, Tactic 2 pt/A
7-25-18: Bravo 3 pt/A, Inspire Super 16 oz/A, Portal 1 qt/A, Assail 4 oz/A, Tactic 2 pt/A
8-6-18: Bravo 3 pt/A, Apovia Top 13.5 oz/A, Reaper 8 oz/A, Besiege 10 oz/A, Tactic 2 pt/A
8-13-18: Bravo 3 pt/A, Apovia Top 13.5 oz/A, Kocide 3000 1 lb/A, Tactic 2 pt/A
8-22-18: Bravo 3 pt/A, Orandis 3 oz/A, Revus 8 oz/A, Reaper 10 oz/A
8-27-18: Manzate 2 qt/A, Aprovia Top 14 oz/A, Kocide 1 lb/A, Ranman 3 oz/A, Zeal 3 oz/A,
Warrior 2.5 oz/A, Tactic 2 pt/A
9-5-18: Aprovia Top 13.5 oz/A, Forum 10 oz/A, Tombstone 4.5 oz/A, Tactic 2 pt/A
9-11-18: Forum 10 oz/A, Quadris Top 14 oz/A, Tombstone 4.5 oz/A, Tactic 2 pt/A

Irrigation was applied regularly as determined by experiment station farm staff.

September weather was unusually hot, and harvest was extended into October.

Harvest

Fruit were harvested three times. The first harvest was on September 6 at 77 days after transplanting (DAT), the second harvest was 88 DAT, and the final harvest was in October at 104 DAT. The weight of each watermelon harvested was recorded individually. Five marketable watermelons from each plot were cut and evaluated for presence of hollow heart, hard seeds and soluble solids levels. Watermelons were cut lengthwise and then crosswise and the number of hard seeds visible on the surface of the four pieces were counted. Soluble solids were measured using a hand-held refractometer. Hollow heart was rated on a 1-5 scale with 1 being no hollow heart and 5 being severe hollow heart.

Results

Marketable yield excluding misshapen culls and fruit less than 2 lbs are reported in Table 2 in both pounds per acre and fruit per acre for each variety. Yields in the trial ranged from 51,527 to 104,484 lbs/A.

The highest yielding variety in the trial was Extazy which yielded 25,000 lbs per acre and 2000 fruit per acre more than the nearest variety (104,484 lbs/a, 15,548 fruit/a). Promesa, Ana, Titan, Sorbet, Mini Bee, Paragon, Leopard, and ORS 7033 b were in the next group ranging from 78,976 to 62,530 lbs/a. The bottom group under 60,000 lbs per acre consisted of Serval, Early Riser, and Ocelot (a very small type). Promesa, Ana, Titan, Sorbet, Mini Bee, Paragon, Leopard, and ORS 7033 b yielded over 10,000 melons per acre. Ocelot had the fewest fruits harvested at 7706 per acre.

Table 3 reports the percent of total for each harvest. The following varieties produced more than 40% of their yield on the first harvest: Promesa, Sorbet, Early Riser and Ana. All varieties produced over 40% of their yield on the second harvest. The third harvest was 20 % or less for all varieties.

Table 4 lists the varieties according to average fruit weight and gives the percentage of fruit in each of five weight classes: <4 lbs, 4-6 lbs, 6-8 lbs, 8-10 lbs, and >10 lbs. Ocelot had 26% of melons harvested less than 4 lbs. Those varieties with predominantly 4-6 lb melons were Early

Riser, Mini Bee, Paragon, Titan, Serval, and Ocelot. Sorbet, Promesa, Extazy, Leopard, Early Riser, Mini Bee, and Titan produced over 30% of melons between 6-8 lbs. ORS 7033 b and Ana had over 30 percent in the 8-10 lbs class and Sorbet and ORS 7133 b had significant numbers of larger melons (over 10 lbs).

Quality and attribute data for mini varieties are given in Table 5. Soluble solids were lower than expected. All varieties had average soluble solid values of greater than 9.6; however, only Extazy, Ocelot, ORS 7033 b and Sorbet achieved average soluble solids of 10 or higher.

Hollow heart (Table 5) was minor or not present in all varieties. Hard seed levels were low in all varieties also. Also given are mean length and width measurements (cm).

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Brian Hearn and Ward Harris for pesticide, fertilizer, and irrigation applications. Research farm staff that tilled the plots and laid and removed plastic mulch.

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Table 1. Entries in the 2018 University of Delaware Mini Seedless Watermelon Variety Trial

Variety	Entering Company
Extazy	Hazera
Leopard	Hazera
Ocelot	Hazera
Serval	Hazera
Sorbet	Hollar
Ana	Origene
ORS 7033 b	Origene
Promesa	Origene
Mini Bee	Siegers
Early Riser	Sostena
Paragon	Sostena
Titan	Sostena












			
Extazy	Leopard	Ocelot	Serval
			
Sorbet	Ana	ORS 7033 b	Promesa
			Photo not available
Mini Bee	Early Riser	Paragon	Titan

Table 2. 2018 Mini Seedless Watermelon Variety Trial: Varieties by Marketable Yield (all marketable fruit over 2 lbs) in Lbs/a and Fruits/a and Fruits per Harvest

Variety	Yields and Harvest Distribution					
			Fruits per harvest (No/a)			
	Marketable lbs/a	Marketable Fruits/a	Harvest 1 77 DAT	Harvest 2 88 DAT	Harvest 3 104 DAT	
Extazy	104484 a	15548 a	5739	8781	1037	
Promesa	78976 b	13543 ab	5030	4823	726	
Ana	77603 b	11814 bc	4218	5186	691	
Titan	77348 bc	10984 bcd	2489	9611	1452	
Sorbet	73883 bcd	10777 bcd	4149	3872	1175	
Mini Bee	72086 bcd	10777 bcd	2627	6845	2351	
Paragon	63018 bcde	10736 bcd	3181	7053	761	
Leopard	62744 bcde	10155 cd	2489	6569	1106	
ORS 7033 B	62530 bcde	10086 cd	2282	5186	415	
Serval	57400 cde	9187 cd	2420	6914	1452	
Early Riser	54254 de	8841 cd	3872	3941	1037	
Ocelot	51527 e	7706 d	2835	7191	761	
<i>p-value</i>	0.0013	0.012				
LSD_{0.05}	40705	3357				

Table 3. 2018 Mini Seedless Watermelon Variety Trial: Percent of Total Harvested at Each Harvest by Fruit Number

Variety	Percent of Total Harvested at Each Harvest by Number		
	Harvest 1 79 DAT	Harvest 2 99 DAT	Harvest 3 120 DAT
Promesa	48	46	7
Sorbet	45	42	13
Early Riser	44	45	12
Ana	42	51	7
Extazy	37	56	7
ORS 7033 B	29	66	5
Paragon	29	64	7
Ocelot	26	67	7
Leopard	24	65	11
Serval	22	64	13
Mini Bee	22	58	20
Titan	18	71	11

Table 4. 2018 Mini Seedless Watermelon Variety Trial: Varieties by Average Fruit Weight and Percent of Fruit in Each Size Class

Variety	Mean Marketable Weight (lbs)		Percent of Fruit in Each Size Class				
			<4 lbs	4 to 6 lbs.	6 to 8 lbs.	8 to 10 lbs.	> 10 lbs
ORS 7033 B	8.12	a	3	11	28	41	18
Sorbet	8.04	a	5	18	24	29	23
Ana	7.70	ab	1	12	51	30	7
Promesa	7.34	b	4	21	37	25	12
Extazy	6.72	c	4	32	38	19	6
Leopard	6.18	d	10	39	33	16	3
Early Riser	6.14	de	5	41	40	14	0
Mini Bee	6.10	de	9	40	39	9	3
Paragon	5.74	ef	13	48	27	9	3
Titan	5.71	f	13	45	32	9	1
Serval	5.33	g	13	64	16	6	1
Ocelot	4.78	h	26	59	13	1	1
<i>p-value</i>	<i><0.0001</i>						
<i>LSD 0.05</i>	<i>0.48</i>						

Table 5. 2018 Mini Seedless Watermelon Variety Trial: Summary of Quality and Attribute Data (mean values).

Variety	Soluble Solids %	Hollow Heart	Hard Seed	Length (cm)	Width (cm)
Ana	9.7	1.0	0.3	19.2	18.4
Early Riser	9.8	1.0	0.5	17.2	17.5
Extazy	10.2	1.2	0.5	19.2	18.1
Leopard	9.6	1.1	0.9	19.0	18.2
Mini Bee	9.8	1.0	0.9	18.5	17.1
Ocelot	10.0	1.0	0.9	16.6	15.8
ORS 7033 B	10.2	1.2	0.3	18.8	19.2
Paragon	9.9	1.1	0.1	19.0	17.8
Promesa	9.9	1.2	0.5	19.8	18.9
Serval	9.9	1.0	0.4	17.5	17.3
Sorbet	10.0	1.1	0.6	19.4	19.5
Titan	9.9	1.0	0.8	18.4	18.0

APPENDIX A:
Weather Summary for the 2018 Mini Seedless Watermelon Variety Trial
May – October

Appendix B1. Weather data for the Georgetown REC site May 2018.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1	62.8	78	40.8	9.4	40.9	87.8	16.8	27.2	6.3	0	0.24	57.2	61.3	53.3	
2	71.7	88.6	54.3	21.5	42.4	72	16.5	26.6	6.2	0	0.28	59.5	63.8	55.4	
3	77	87.3	64.7	26	49.3	67.8	33.9	26.1	10.6	0	0.31	62.6	65.8	59.7	
4	77.5	86.9	67.3	27.1	53.8	69.9	41.7	24.5	10.9	0	0.29	64.8	67.6	62.4	
5	68.2	76.3	58.3	17.3	55.4	75.7	31.2	14.7	5.6	0.01	0.17	64.9	66.5	63.6	
6	61.3	67.7	56.7	12.2	89.4	97.4	65.5	6.2	3.7	0.01	0.07	62.8	63.9	61.9	
7	61.7	71.6	53.6	12.6	75.6	96.7	45.5	20.6	5.5	0	0.16	63.5	65.9	61.9	
8	58.2	68.9	48.2	8.6	78.1	98.5	50.9	27	6.5	0	0.17	62.7	65.9	59.8	
9	59.8	72.3	49.4	10.9	70.3	99.2	29.3	26.9	5.1	0	0.19	63.8	67.3	61.2	
10	65.7	83	45.7	14.3	72.7	97.7	44.5	24.1	8.8	0	0.22	62.7	65.8	59.5	
11	70.6	82.2	60.1	21.2	65.3	97.2	36.3	26.1	7.5	0	0.24	65.2	68.2	62.6	
12	74.2	89.8	58.8	24.3	66.2	97.6	37.8	25	6.6	1.41	0.25	66.2	69.6	63.4	
13	59.1	63.7	56	9.9	94.7	99	84.3	8.3	5.9	0.69	0.06	65.9	66.9	65	
14	64.8	79	55.6	17.3	89.4	98.8	68.9	16.6	4	1.41	0.13	63.2	66.2	60.8	
15	75	84.6	65.2	24.9	78.2	96.5	62.4	23.7	11.1	0.26	0.21	66.8	69.3	64.7	
16	66.5	74.2	62	18.1	92.6	98.3	73.5	9.5	4	0.4	0.09	67.9	68.8	66.9	
17	64.2	69.9	59.6	14.8	96.4	99	89	6.3	3.4	0.11	0.05	67.4	68	66.8	
18	59.3	65.6	54.1	9.8	97.1	98.6	94.5	2.6	7	2.96	0.03	65.2	67.1	63.7	
19	66	78.1	55.4	16.7	94.3	98.7	83.2	9.9	7	1.19	0.08	64.3	66.4	62.6	
20	76.1	83.5	70.1	26.8	81.3	95.4	64	20.9	10.3	0.01	0.19	68.1	70.5	66.3	
21	69	75	60	17.5	71.5	97.2	52.6	26.9	5.9	0	0.19	70.1	72.9	68	
22	69.1	79.6	59.6	19.6	81.9	95.5	60	17.9	5.4	0.48	0.15	69.5	71.1	67.9	
23	73.1	81.3	65.8	23.6	76.6	98.3	50.7	22.1	7.5	0	0.2	70.5	72.4	68.9	
24	70.4	82.2	60.4	21.3	64.5	93	30.4	28.5	4.7	0	0.23	70.4	73.3	67.7	
25	72.1	82.6	57.8	20.2	70.7	95	46	27.6	8.1	0	0.23	69.8	71.7	67.4	
26	79	88.1	69.2	28.6	73.7	90.6	54.6	25.9	9.1	0	0.25	71.5	74	69.5	
27	72.8	85	58.8	21.9	88.3	97.9	68.3	15.1	6.7	1.16	0.14	72.7	74.3	71.7	
28	61.4	65.7	57.3	11.5	93.4	97.7	85.6	8.5	4.4	0.1	0.07	70.4	71.9	69.8	
29	70.9	79.8	62.2	21	89.3	99.2	72.7	15	2.6	0	0.12	70.6	72.3	69.2	
30	68.9	75.1	65	20	95	99.1	81.8	10.5	4.8	0.02	0.09	71.6	72.5	70.8	
31	74.2	83.2	65.1	24.2	89.7	99.3	73.8	16.8	5	0.01	0.14	72.1	73.9	70.6	
A	Day														
B	Avg Temp			(°F)			I			Avg Solar			(MJ.m ⁻² .day ⁻¹)		
C	Max Temp			(°F)			J			Avg Wind Speed			(mph)		
D	Min Temp			(°F)			K			Rainfall			(in)		
E	GDD			(base 50 °F)			L			Ref ET			(in day ⁻¹)		
F	Avg RH			(%)			M			Avg Soil Temp			(°F)		
G	Max RH			(%)			N			Max Soil Temp			(°F)		
H	Min RH			(%)			O			Min Soil Temp			(°F)		

Appendix B2. Weather data for the Georgetown REC site June 2018.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	77.2	85.7	70	27.9	84.6	97.8	54.4	18.6	4.2	0.09	0.17	73.3	74.8	72
2	75.3	81.9	70.2	26.1	86.9	98.5	71.8	12.3	3.3	0	0.11	73.4	74.5	72.3
3	62.8	70.9	58.2	14.5	94.8	98.9	84.2	4.1	9.3	0.96	0.05	71.3	73.6	69.1
4	64.2	74.4	55.2	14.8	83.5	97.9	60.1	25.5	8.2	0.04	0.18	69.3	71.1	67.9
5	70.2	80.3	55.9	18.1	65.3	98.1	39.9	27.2	7.1	0	0.23	69.1	70.7	67.3
6	64.9	70.7	59.8	15.3	70.7	91.4	52.1	26.2	5	0	0.18	69.8	72.3	67.7
7	66	75	58.2	16.6	74.3	95.1	53.2	23	4.2	0	0.17	69.8	71.8	68.1
8	70.7	82.1	56.7	19.4	75.1	98.5	53.2	22.5	5.3	0	0.19	69.1	70.9	67
9	70.7	82.9	65.4	24.1	90.6	98.2	71.4	10.1	4.7	4.2	0.1	69.9	71.4	68.9
10	69.9	76.9	65.6	21.2	91.7	98.6	76.4	15.5	4.7	0.79	0.12	71.1	72.9	69.9
11	61.3	65.7	56.3	11	89.7	98.2	75.4	9.3	6.8	0.16	0.08	70.6	71.8	69.5
12	64.7	73	54.2	13.6	75	97.6	49.7	26.9	5.1	0	0.18	69.2	71.6	66.8
13	73.2	82.2	62.5	22.3	84.6	98.8	68.7	22.7	7	0.03	0.18	70.9	72.8	69.4
14	77.3	83.7	69.3	26.5	59.5	95.7	32.7	28	8.7	0	0.27	72.5	73.5	71.8
15	72	80.4	62.8	21.6	53.4	85.7	33.3	28.2	6.4	0	0.25	71.1	72.7	69.4
16	72.1	84.3	55.9	20.1	63.4	96.7	36	27.6	3.7	0	0.22	69.9	72	67.6
17	76.5	88.4	63	25.7	66.5	94	37.6	27.3	4.4	0	0.24	71.3	74	68.7
18	79.2	90.8	68.7	29.7	73.4	99	45	26.7	5	0	0.24	73.4	75.4	71.9
19	82.4	90.8	76	33.4	75.8	95.1	55.6	18.6	6.5	0	0.2	74.7	76.1	73.5
20	77.9	88.7	70.4	29.5	84.1	98.8	46.8	17.1	4.5	0	0.18	74.9	76.3	73.6
21	76	82.7	69.1	25.9	84.3	95.7	68.5	18.4	5.4	0	0.16	75.1	76.2	74.2
22	68.5	71.3	66.2	18.8	90.9	96.7	78.7	6.8	6.2	0.52	0.07	72.8	74.6	72.1
23	74.9	84.8	67.5	26.1	87.5	98.9	68.5	16.2	4.1	0.02	0.14	73	74.6	71.8
24	79.4	91	70.8	30.9	78.1	99	43.7	22.2	5.5	0.01	0.22	74.1	75.6	72.8
25	75.3	83.4	67.5	25.4	73.4	97.1	47	25.6	6.2	0	0.22	74.2	75.4	73.1
26	71.5	79.3	62.7	21	69	97.9	37	28.2	5.8	0	0.23	72.8	74.6	70.9
27	73.4	81.6	64.7	23.1	75	90.5	56.3	16.8	9	0	0.18	71.9	72.9	71
28	80.5	90.3	73	31.6	73.8	95.1	46.2	21.8	7	0	0.23	73.4	75.1	72.1
29	80.3	90.7	70.9	30.8	68.7	92.8	41.8	27.4	4.1	0	0.25	74.1	76.1	72.3
30	80.9	93.4	67.4	30.4	70.5	96.8	44.5	26.1	3.1	0	0.23	74.1	76.1	71.9
A	Day													
B	Avg Temp			(°F)				I	Avg Solar			(MJ.m ² .day ⁻¹)		
C	Max Temp			(°F)				J	Avg Wind Speed			(mph)		
D	Min Temp			(°F)				K	Rainfall			(in)		
E	GDD			(base 50 °F)				L	Ref ET			(in day ⁻¹)		
F	Avg RH			(%)				M	Avg Soil Temp			(°F)		
G	Max RH			(%)				N	Max Soil Temp			(°F)		
H	Min RH			(%)				O	Min Soil Temp			(°F)		

Appendix B3. Weather data for the Georgetown REC site July 2018.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O		
1	82	95.1	69.1	32.1	71.9	97.9	43.4	27.1	4	0	0.25	74.6	77	72.2		
2	84.2	96.9	72.9	34.9	76.3	98.2	45.9	26.1	3.8	0	0.25	75.9	78.2	73.6		
3	83.3	93.9	75.6	34.7	78.5	98.9	54	23.3	3.1	0	0.21	77.3	79.5	75.5		
4	80.1	88.1	71.5	29.8	81.6	98.3	55.9	26.1	N/A	0	N/A	77.3	79.6	75.1		
5	80.2	89.1	72.7	30.9	84.5	98.5	62.2	21.5	N/A	0	N/A	77.2	78.7	75.5		
6	78.9	85.4	75.3	30.4	90.5	97	70.4	10.9	4.1	0	0.11	77	77.8	76.3		
7	69.7	75.4	60	17.7	66.9	93.5	52.1	22.3	9.2	0	0.19	75.2	76.9	73.7		
8	67	77.6	55.1	16.4	68.8	95.1	35.3	30.2	5.7	0	0.23	72.3	75.3	69.2		
9	69	84.6	52	18.3	64.9	97.3	28.5	29.6	3.9	0	0.23	71.1	74.4	67.7		
10	76.7	91.6	59.3	25.4	65.1	92.7	33.6	28.4	3.5	0	0.24	71.7	75	68.3		
11	79.9	90.7	70.7	30.7	68.3	95.9	37.4	24.8	4.5	0	0.24	74.2	76.9	71.8		
12	74	81.1	67.1	24.1	80.1	98	52.8	23.8	4.6	0	0.19	74.7	77.1	72.5		
13	72.7	82.3	62.4	22.3	71	98.5	37.1	27.8	4.3	0	0.22	73.9	76.7	71.3		
14	73	86.6	57.2	21.9	66.4	97.9	34	28.1	4.5	0	0.24	72.5	75.5	69.5		
15	77.9	88.3	67.9	28.1	72.8	95	49.6	22.1	5.9	0	0.21	73.7	76	71.7		
16	81.6	91.7	73.2	32.4	75.4	94.2	53.1	24.6	6.7	0	0.24	75.4	78.2	73.3		
17	80.1	92.4	72.2	32.3	80.3	97.9	42.7	21.7	8.3	0	0.25	76.6	78.8	75.1		
18	77.2	86.1	70.7	28.4	72.8	98.6	37.9	25.5	5.7	0.02	0.24	77	80	74.9		
19	75.3	85.5	66.4	26	64.9	96.7	34.6	28.3	4.4	0	0.24	76.5	80.2	73.1		
20	72.4	82.7	60.2	21.5	73.3	97.6	38.5	25.2	4.2	0	0.21	75	78.5	71.2		
21	72	75.1	65.1	20.1	93	97.9	84.9	5	6.6	1.89	0.06	73.3	74.9	72.4		
22	77.6	86	69.1	27.5	85.4	97.5	67.3	21.8	10.8	0.03	0.19	75.1	77.9	72.9		
23	80	84.8	76.4	30.6	84.5	94.9	71.9	16.8	12.2	0.05	0.17	76.9	78.3	75.8		
24	78.8	83.7	74.1	28.9	85.4	94.8	72.4	15.6	11.2	0.37	0.15	76.8	77.6	75.9		
25	76.3	81.3	72.4	26.8	91.1	98.1	81.5	13.1	6.7	0.88	0.11	76.5	77.8	75.3		
26	78.2	86.7	71.9	29.3	84.2	98.4	62.7	22	5	0.02	0.19	77.6	80.4	75.5		
27	79	90.4	71.2	30.8	84.3	97.8	55.8	20	4.2	0	0.19	78.1	81	75.7		
28	78.2	86.1	70.2	28.1	82.7	98.7	59	20.4	3	0.01	0.17	78.3	80.5	76.4		
29	75.2	84.8	68	26.4	75.4	97.1	49.6	22.5	3.3	0	0.19	77.2	79.6	75		
30	70.5	73.1	67.3	20.2	94	97.7	87.3	5.8	3.7	0.43	0.06	74.9	76.8	74.4		
31	75.4	82.1	68.7	25.4	91.6	98.2	75.6	12.7	3.9	0.04	0.11	75.4	77.2	73.9		
A	Day															
B	Avg Temp			(°F)						I	Avg Solar			(MJ.m ² .day ⁻¹)		
C	Max Temp			(°F)						J	Avg Wind Speed			(mph)		
D	Min Temp			(°F)						K	Rainfall			(in)		
E	GDD			(base 50 °F)						L	Ref ET			(in day ⁻¹)		
F	Avg RH			(%)						M	Avg Soil Temp			(°F)		
G	Max RH			(%)						N	Max Soil Temp			(°F)		
H	Min RH			(%)						O	Min Soil Temp			(°F)		

Appendix B4. Weather data for the Georgetown REC site August 2018.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	80.4	86.7	74.6	30.6	84	98.2	68.4	20.9	8.4	0	0.18	77.2	79.2	75.6
2	80.5	88.9	75.1	32	82.9	97.5	61.8	23.4	8	0.1	0.21	78.3	80.6	76.5
3	78.3	85.5	73.4	29.4	85.9	98.2	63.7	19	7.7	0.03	0.18	78	79.4	76.8
4	78.3	85.9	72.9	29.4	83.2	96.8	61.3	21	6.7	0.14	0.19	78	79.7	76.6
5	80.1	92.2	69.2	30.7	79.1	99.1	43.9	25.9	2.4	0.01	0.22	77.9	80.7	75.3
6	78.3	92.4	69.5	31	85.4	99.1	53.1	18.4	2.9	0.03	0.17	77.8	79.9	75.7
7	80.8	91	71.3	31.1	84	98.6	56.4	23.1	5	0	0.21	78.2	80.7	75.9
8	81.8	91.4	72.8	32.1	79	98.6	52.3	24.1	3.5	0	0.21	79.1	81.2	77.1
9	80.4	88.9	73.6	31.2	78.4	95.9	53.3	23.7	4.6	0	0.21	79	80.8	77.4
10	79.8	90.7	69.1	29.9	77.9	98.7	44.3	23.5	2.2	0	0.19	78.1	80.3	75.8
11	77	87.7	69.8	28.8	88.3	97.8	68	14.2	3.8	0.29	0.13	77.6	79.1	76
12	76.4	88.1	68.4	28.2	86	98.6	57.6	19.8	3.2	0.14	0.17	77.6	79.7	75.7
13	77.7	86.2	71.8	29	84.5	98.6	60.4	19.9	4.3	0	0.17	78.1	79.8	76.5
14	75.6	84.5	67.6	26.1	79.4	98.1	52.9	23.7	6.8	0.02	0.2	77.2	78.9	75.5
15	77.7	87.9	69	28.4	77.7	96.8	50.1	23.3	5.3	0	0.21	77	79	75.1
16	78.4	90.3	68.1	29.2	79.4	99	48.6	20.6	3.3	0	0.18	76.3	78.7	73.8
17	81.5	92.5	71.4	31.9	78.8	98.6	49.6	20.6	5.4	0	0.21	76.7	79.1	74.4
18	82.3	90.4	76.7	33.5	79.1	94	54.9	18.6	6.5	0	0.2	78.3	80.2	76.7
19	76	84.1	71.6	27.8	88.3	98.8	68.8	14.5	5.2	0.02	0.13	77.8	78.9	76.4
20	73.9	78.2	71.3	24.8	87.2	95.6	77.3	8.9	5.2	0	0.09	76.3	77.2	75.7
21	75.8	82	69.2	25.6	89.3	98.5	74.2	11.8	5.7	0.61	0.11	75.7	76.9	74.4
22	77.6	84.8	72.4	28.6	85	98	59.2	15.9	7	0.01	0.16	76.7	78	75.8
23	70.3	78.3	60.5	19.4	71.7	95.3	42.4	23.3	6.8	0	0.19	75.2	76.6	73.4
24	69.8	84.8	56	20.4	72	98.6	35.9	24.5	2.2	0	0.18	72.4	75.1	69.4
25	69.7	82.6	55.9	19.2	77.5	97.9	48.3	19.8	2	0	0.15	71.6	74.1	68.9
26	74	86.8	59.7	23.2	78.8	98.9	49.7	22.5	4.5	0	0.19	72.5	75.4	69.5
27	79.7	91.1	69.3	30.2	81.2	98.9	54.1	21.3	3.1	0	0.18	74.8	77.7	72.1
28	83.4	94.8	73.5	34.1	78.3	98.9	49.2	20.7	4.9	0	0.21	76.3	79	73.8
29	84.6	95.5	77.1	36.3	77	96.2	50.7	22	6.7	0	0.23	78	80.6	75.9
30	83.3	92.1	75.2	33.6	74.6	95	46.6	22.3	5	0	0.21	78.7	81.1	76.8
31	76.9	86.9	71.2	29	88.5	98.2	67.3	14	4.9	0.66	0.13	77.8	79.4	76.4
A	Day													
B	Avg Temp			(°F)				I	Avg Solar			(MJ.m ² .day ⁻¹)		
C	Max Temp			(°F)				J	Avg Wind Speed			(mph)		
D	Min Temp			(°F)				K	Rainfall			(in)		
E	GDD			(base 50 °F)				L	Ref ET			(in day ⁻¹)		
F	Avg RH			(%)				M	Avg Soil Temp			(°F)		
G	Max RH			(%)				N	Max Soil Temp			(°F)		
H	Min RH			(%)				O	Min Soil Temp			(°F)		

Appendix B5. Weather data for the Georgetown REC site September 2018.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	77.1	83.4	72.5	27.9	90.3	97.6	77.2	17.2	4.3	0.07	0.14	77.8	79.6	76.5
2	78.7	88.4	73.7	31	87.7	98.6	59.4	14.9	3.3	0	0.14	78.1	79.7	76.7
3	79.7	92.3	71.8	32.1	86.4	99	54.2	17.7	2.8	0	0.16	77.9	80.1	75.7
4	80.7	94.6	71.7	33.1	84.7	99.2	52.8	21.2	2.5	0	0.18	78.3	80.8	76
5	80.5	93.3	72.3	32.8	85	99.2	50.7	16.9	2.6	0	0.16	78.2	80.3	76.1
6	82.5	94.4	74.2	34.3	78.5	98.8	49.8	20.1	4.1	0	0.19	78.5	80.6	76.5
7	76.9	91.1	72.2	31.6	90.4	98.9	60.7	12.4	2.8	1.08	0.12	77.1	79	76.2
8	71.8	76.6	67.2	21.9	95.1	98.6	86.2	5.1	6.7	1.29	0.06	75.6	76.4	74.6
9	66.7	70.5	63.4	16.9	92.3	96.6	80.4	3.1	8	0.92	0.05	73.4	74.6	71.7
10	70.7	78.1	63.4	20.8	94.1	99	85.7	8.9	6.1	0.17	0.07	72.2	73.7	71.2
11	76.2	87.8	72	29.9	94.4	99.8	68.4	12	3.1	0.07	0.11	74.5	75.9	73.4
12	77.5	86.7	73.1	29.9	91.1	99.9	68.2	16.3	3.4	0.01	0.14	76	77.6	74.9
13	74.4	79.4	71.8	25.6	97	99.5	86.5	6.9	8	0.04	0.07	75.9	76.3	75.6
14	74.3	78.8	71.8	25.3	94.8	99.5	78.2	7.6	7.3	0.62	0.08	75.4	75.9	74.9
15	72.9	79.7	67.7	23.7	89.5	98.7	73.4	12	5.9	0.04	0.1	75.3	76.1	74.6
16	74.4	80.1	69.6	24.9	89.2	99.1	72	16.7	5	0	0.13	75.1	76.4	74.1
17	76.5	82.5	71.8	27.1	90.8	99.3	74.2	8	7.5	0.01	0.09	75.2	75.8	74.6
18	77.9	86.6	71.2	28.9	89.5	98.7	66.9	9.8	8.3	1.26	0.12	75.8	76.8	75.2
19	73.9	83.4	67.2	25.3	85.8	99.4	59.7	18.9	5.6	0	0.15	75.2	76.2	74.1
20	69.9	76.8	64.1	20.4	86.7	99.6	67.3	13.8	3.5	0	0.1	73.9	74.8	73.1
21	69.8	79.8	60.3	20.1	84.9	99.3	63.2	13.9	5.4	0	0.12	72.2	73.3	70.9
22	73	82	64.4	23.2	80.7	96.8	62.3	13.1	6.9	0	0.13	73.1	74.4	72.1
23	64.6	67.9	63	15.4	95.2	98.9	85.5	2.6	6	0.98	0.04	71.6	72.9	70.7
24	65.6	67.9	63.8	15.8	95.6	98.1	89.9	3	6.3	0.31	0.04	70.4	70.7	70.2
25	75.7	84.4	68	26.2	86.4	96.8	67.5	14	6.6	0.02	0.13	71.4	72.9	70.1
26	77.2	87	71.2	29.1	88	99.9	60.3	12.8	5.7	0.02	0.13	73.2	74.4	72.4
27	68.5	71.2	66.1	18.6	83.3	98.3	65	9.6	5.5	0.08	0.09	72.6	73.7	71.9
28	67.3	76	56.6	16.3	89	99.6	69.3	9.3	6.6	0.06	0.09	71.5	72	69.6
29	64.5	77.9	53.5	15.7	85.2	100	50.8	15.9	2.4	0.01	0.11	68.5	70.1	66.7
30	65.7	77.9	55.7	16.8	82	98.7	51	15.5	2.6	0	0.11	68	69.5	66.4
A	Day													
B	Avg Temp			(°F)				I	Avg Solar			(MJ.m ⁻² .day ⁻¹)		
C	Max Temp			(°F)				J	Avg Wind Speed			(mph)		
D	Min Temp			(°F)				K	Rainfall			(in)		
E	GDD			(base 50 °F)				L	Ref ET			(in day ⁻¹)		
F	Avg RH			(%)				M	Avg Soil Temp			(°F)		
G	Max RH			(%)				N	Max Soil Temp			(°F)		
H	Min RH			(%)				O	Min Soil Temp			(°F)		

Appendix B5. Weather data for the Georgetown REC site October 2018.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	69.2	81.8	58.7	20.2	81.9	99.5	57	16.3	5.1	0	0.13	67.8	69.6	66.1
2	72.5	83.2	62.2	22.7	81.9	99.6	58	15.8	7.6	0	0.14	69.2	70.8	67.5
3	73.6	84.1	63	23.6	83	99.2	53.7	15.4	4.4	0	0.13	70.9	72.9	69.5
4	74.9	88.9	62.1	25.5	82.7	99.7	49.1	15	3.7	0	0.13	70.7	73	68.5
5	69.6	75	65.5	20.3	92.1	98.9	77.6	3.8	6.1	0.01	0.06	71.6	72.4	70.4
6	70	75.7	66.2	20.9	92.9	99.5	79	7.6	3.7	0.02	0.06	71.4	73.5	69.7
7	74.5	86.4	66.5	26.4	86.8	99.7	61	13.1	3.7	0	0.11	72.9	76.5	70.1
8	73.4	84.6	65.5	25.1	89.4	100	65.2	11.5	2.9	0	0.1	73.6	76.8	70.9
9	74.4	84.5	68.2	26.3	89.6	99.9	63.2	9.7	3	0	0.09	73.9	76.8	71.5
10	75.6	85.6	69.2	27.4	86.2	99.9	54.7	12	5.4	0	0.12	74.1	76.7	72
11	76.9	84.4	68.3	26.3	92.8	99.2	72.7	7.7	7.5	0.53	0.09	74.9	76.9	73.1
12	61.1	70.7	49.5	10.1	74.1	98.8	47.7	17.2	12.4	1.47	0.14	70.2	75.4	66.2
13	52.1	59.8	44.3	2	78.1	96.5	51.4	10.8	5.6	0.2	0.08	64.5	66.2	62.1
14	53.6	62.8	42.9	2.8	79.2	98.7	51.2	7.3	2.3	0.05	0.06	61.8	64.4	59.3
15	67.5	76.1	59.3	17.7	83.4	98.4	70.9	7.4	8.9	0.01	0.08	65.1	67.8	62.8
16	58.7	73.7	52.8	13.2	69.9	92.4	54.2	7	6.7	0	0.1	65.2	67.6	63
17	58.1	66.3	50.1	8.2	66	95.9	27.3	15.6	6.8	0	0.13	63.3	65.5	61.4
18	48.2	56.1	39.2	0	63.5	97.5	39.6	16.5	6.1	0	0.09	59.7	62.5	57
19	50.4	63.7	35	0	74.9	99.4	43.2	16	5.5	0	0.09	57.9	61.8	54
20	59.4	64.2	53.4	8.8	85.9	98.5	68.3	4.7	7.8	0	0.06	60.3	62.1	59
21	47.9	53	36.1	0	65.9	92.1	44.3	13.7	11.8	0	0.09	57.3	59.9	54.3
22	43.9	56.2	31.5	0	76.4	99	42.2	15.7	4.1	0.08	0.07	54.2	58.2	50.5
23	54.7	69.5	41.8	5.7	70	97	35.9	14.8	5.2	0	0.11	56.3	60.7	52.5
24	48.6	55.8	38.2	0	60.5	88	40.6	14.8	8.9	0	0.1	55.4	57.8	53.2
25	43.4	53.6	34.9	0	73.7	95	46.2	12.8	5.2	0	0.07	53.2	56.4	50.1
26	47.1	56.2	36.6	0	86.1	98.6	65.4	4.6	4.5	1.04	0.04	52.7	53.9	50.8
27	56	62.7	46.3	4.5	95	98.7	86.1	3.9	10	0.7	0.04	56.5	59.1	53.9
28	52.9	58.7	48.3	3.5	84.9	99	59.8	8.3	6.4	0.11	0.06	56	58.3	54.6
29	53.9	60.6	43.8	2.2	71.1	89	52	10.2	10.2	0	0.09	55.3	57.1	53.5
30	48.5	60.3	38.5	0	77.8	97.8	46.6	14.5	5	0	0.08	53	56.4	49.7
31	54.5	68.1	39.2	3.7	77.3	99.5	46.9	12.1	7.2	0	0.1	53.4	56.9	50
A	Day													
B	Avg Temp			(°F)				I	Avg Solar			(MJ.m ⁻² .day ⁻¹)		
C	Max Temp			(°F)				J	Avg Wind Speed			(mph)		
D	Min Temp			(°F)				K	Rainfall			(in)		
E	GDD			(base 50 °F)				L	Ref ET			(in day ⁻¹)		
F	Avg RH			(%)				M	Avg Soil Temp			(°F)		
G	Max RH			(%)				N	Max Soil Temp			(°F)		
H	Min RH			(%)				O	Min Soil Temp			(°F)		