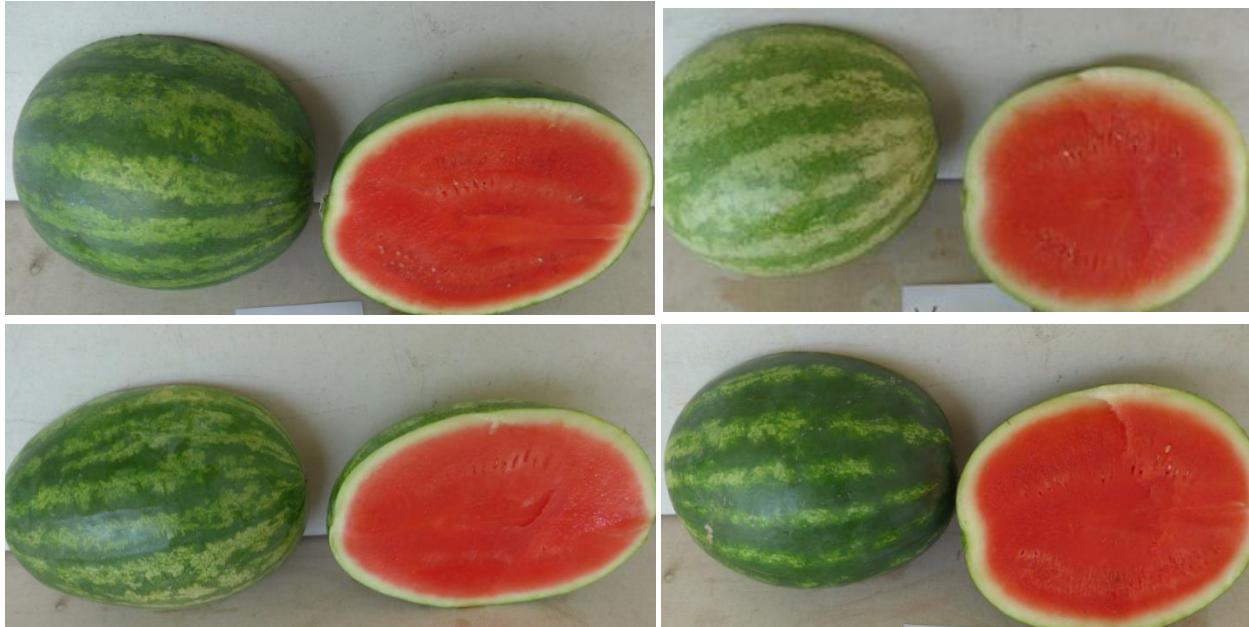




Cooperative Extension
COLLEGE OF AGRICULTURE &
NATURAL RESOURCES



Seedless Watermelon Variety Trial Results 2018

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2018 University of Delaware Seedless Watermelon Variety Trial

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Introduction

The 2018 Seedless Watermelon Variety Trial included 36 varieties from ten participating companies. The purpose of this trial was to evaluate seedless watermelon varieties for yield, quality and maturity.

Materials and Methods

Trial Design

The trial was a Randomized Complete Block with four 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 April 16, 2018. Plants were transplanted to the field on May 22, 2018. Field plots were one row (7 ft) wide and 30 ft long. Plots were arranged in a randomized complete block design with four replications. In-row spacing for seedless plants was 3 ft with 9 plants per plot. Four pollinizer plants, one each of the in-row pollenizer varieties SP-7, Accomplice, Wingman, and Ace Plus were planted in each plot and one between plots in the following arrangement:

s 7 s s A s s W s s A+. "7" designates Sp-7, A designates "Accomplice", W designates "Wingman", A+ designates "Ace plus" 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 the pollenizers, 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.

A comprehensive disease, insect and mite control program was used for the trial as follows:

5-24-18: Wrangler (chemigation) 6 oz/A

5-31-18: Mancozeb 2 qt/A, Sniper 6.4 oz/A, Tactic 2 pt/A

6-8-18: Bravo 3 pt/A, Sniper 6.4 oz/A, Tactic 2 pt/A

6-15-18: Bravo 3 pt/A, Sniper 6.4 oz/A, Tactic 2 pt/A

6-21-18: Bravo 3 pt/A, Sniper 6.4 oz/A, Tactic 2 pt/A

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.

The spring was cold and wet. There was heavy rainfall during early growth and one heavy rainfall event over 4” on June 9, 2018 that caused flooding over beds for a 12-hour period. Growth was slow for 3 weeks after flooding leading to a 3-week delay in harvest.

Harvest

Due to the late spring and flooding plots were not harvested until August. Fruit were harvested three times. The first harvest was on August 8 and 9 at 79 days after transplanting (DAT), the second harvest was 99 DAT, and the final harvest was in September at 120 DAT. The weight of each watermelon harvested was recorded individually. Four 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 9 lbs (Marketable Yield I) and marketable yield excluding misshapen culls, fruit less than 9 lbs and fruit over 24 lbs

(Marketable Yield II) are reported in Tables 2 and 3 in both pounds per acre and fruit per acre for each variety. Yields in the trial ranged from 51,057 to 131,904 lbs/A.

The highest yielding varieties in the trial in terms of Marketable Yield I in lbs/A were: Paradigm, Maxima, 9601, ORS60599, Unbridled, ORS 6181, Crunchy Red, Embasy, Charismatic, 7187, Summer Breeze, Road Trip, Premont, Secretariat, Fascination, Kingman, and Joy Ride. This high yielding group ranged from 131,904 to 92,262 lbs per acre.

There were few melons over 24 lbs and Marketable Yield II did not differ greatly from Marketable Yield I. Similarly fruits per acre did not differ greatly between the two groups.

The highest yielding varieties in terms of Marketable Yield I in fruit/A were: Paradigm, 9601, Crunchy Red, Unbridled, ORS 60599, ORS 6181, Maxima, Embasy, Charismatic, Summer Breeze, Premont, Secretariat, 7187, Troubadour, Road Trip, Fascination, and Kingman. This high group ranged from 9,046 to 6396 fruits per acre.

Table 4 reports the percent of total harvest for each harvest. The following varieties produced more than 40% of their yield on the first harvest: Talca, Red Amber, Warrior, Premont, Excursion, and Bottle Rocket. Those varieties with late or extended harvest (50% or more harvested in the third harvest) were Maxima, Troubadour, Eclipse, ORS 6064, and Captivation.

Table 5 lists the varieties according to average fruit weight and gives the percentage of fruit in each of four weight classes: 60-count (9.0-13.5 lbs), 45-count (13.6-17.5 lbs), 36-count (17.6-21.4 lbs) and 30-count (>21.5 lbs). In general, fruit weights were lighter in 2018 than in 2017. Medium fruited varieties over 16 pounds included Maxima, Joy Ride, and Bottle Rocket. Small fruited varieties under 13.5 pounds were ORS 6151, ORS 6064, Troubadour, and Eclipse. All other varieties were between 13.6 to 16 pounds per fruit.

All varieties had greater than 40% of the melons harvested in the 45-count class, except for Troubadour, Eclipse, and Summer Breeze. Fascination had the highest percentage of 45 count melons (66.7 %).

Varieties with 40% or greater percentage of small fruited melons (60-count) included 7187, Summer Breeze, 7197, Cut Above, Premont, 9601, Crunchy Red, Secretariat, 0241 WA, ORS 6151, ORS 6064, Troubadour, and Eclipse.

Varieties with more than 30% 30 and 36-count fruit were Maxima, Joy Ride, and Bottle Rocket.

Table 6 lists varieties by number of fruit in each size class. Varieties with over 4000 melons per acre in the 45-count class included Paradigm, 9601, and Crunchy Red.

Table 7 lists the varieties according to their soluble solid measurements. Soluble solids were lower in 2018 than past years, largely due to cloudy weather and wet conditions. Soluble solids averages are based on a 20-fruit sample (4 fruit per replication). There were few differences in soluble solids among most of the the varieties. All varieties had average soluble solids of over 10% except for 9601, ORS6064, and Eclipse.

Table 8 lists the varieties according to average severity of hollow heart. Hollow heart averages are based on a 20-fruit sample (4 fruit per replication). No hollow heart was observed in Talca. The variety 0241 WA had high levels of hollow heart (66%). Those additional varieties with one or more fruit with major or severe hollow heart (10% or more rating 4 and 5) were 0241 WA, 7197, Unbridled, ORS 6151, ORS 6181, 7187, Charismatic, Kingman, 9601, Tailgate, Warrior, and ORS 6064. The high level of hollow heart in 2018 is likely a result of erratic first set due to a flooding event in June, asynchrony between polinizer flowering and triploid flowering, and reduced bee flights.

Table 9 lists the varieties according to the percent of fruit with enough hard seeds to render them unmarketable. Captivation, ORS 6181, Secretariat, Talca, Turnpike, 0241 WA, Summer Breeze, ORS 6151, 7187, Charismatic, Premont, Kingman, Fascination, and Paradigm all had significant numbers of fruit over standard for hard seed.

Photographs of the varieties included in the trial are in Appendix A.

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Harris Moran, Sakata, Seminis and Syngenta for donation of seed for border rows and pollinizers.

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

Variety	Entering Company
Clifton	Cut Above
Clifton	Premont
Enza Zaden	Red Amber
Enza Zaden	Red Garnet
Highmark	Wolverine
HMClause	Turnpike
HMClause	Crunchy Red (standard check)
HMClause	Troubadour
Nunhems	Warrior
Nunhems	7197HQ
Nunhems	7187HQ (standard check)
Nunhems	Embassy
Nunhems	9601HQ
Origene	ORS6151
Origene	ORS6181 b
Origene	ORS6260 d
Origene	ORS6203
Origene	ORS6064F
Origene	ORS60.599
Origene	Maxima
Sakata	Secretariat
Sakata	Eclipse
Sakata	Charismatic
Sakata	Unbridled
Sakata	Kingman
Seminis	Bottle Rocket
Seminis	Road Trip
Seminis	Joy Ride
Seminis	Tailgate
Seminis	Summer Breeze
Seminis	0241WA
Sostena	Talca
Sostena	Paradigm
Syngenta	Fascination (standard check)
Syngenta	Excursion
Syngenta	Captivation

Table 2. 2018 Seedless Watermelon Variety Trial: Varieties by Marketable I Yield (all marketable fruit over 9 lbs¹) in Lbs/a and Fruits/a and Fruits per Harvest

Variety	Yields and Harvest Distribution					
	Marketable I lbs/a	Marketable I Fruits/a	Fruits per harvest			
			Harvest 1 79 DAT	Harvest 2 99 DAT	Harvest 3 120 DAT	
Paradigm	131904 a	9046 a	2247	1268	4149	
Maxima	128276 ab	7663 abcde	1901	1440	2362	
9601	126470 abc	9046 a	2132	1037	1383	
ORS 60599	124292 abcd	8182 abc	2305	1729	2939	
Unbridled	121867 abcde	8240 abc	980	1901	2823	
ORS 6181 B	120354 abcdef	7894 abcd	2535	1959	3745	
Crunchy Red	116774 abcdefg	8412 ab	2420	1325	2247	
Embassy	108324 abcdefgh	7375 abcdef	2074	1556	1786	
Charismatic	105481 abcdefghi	7087 abcdefg	3400	2362	2650	
7187	104405 abcdefghi	6914 abcdefg	2708	1325	1152	
Summer Breeze	101692 abcdefghi	6972 abcdefg	2362	2996	3688	
Road Trip	97807 abcdefghi	6453 abcdefgh	2190	1729	3976	
Premont	97645 abcdefghi	6972 abcdefg	2650	2939	3457	
Secretariat	96624 abcdefghi	6972 abcdefg	1901	1268	3688	
Fascination	92604 abcdefghij	6453 abcdefgh	2190	1383	2190	
Kingman	92319 abcdefghij	6396 abcdefgh	2362	1671	2939	
Joy Ride	92262 abcdefghij	5704 cdefgh	2362	1325	2708	
Red Amber	88873 bcdefghijk	6050 bcdefgh	1498	1210	2420	
Troubadour	88642 bcdefghijk	6857 abcdefg	1613	2420	3342	
ORS 6260 D	88181 bcdefghijk	5762 bcdefgh	2132	2420	2535	
Wolverine	86616 cdefghijk	5992 bcdefgh	864	1440	3400	
Bottle Rocket	86527 cdefghijk	5416 defgh	1901	807	1844	
Turnpike	86518 cdefghijk	5762 bcdefgh	807	1037	2190	
Tailgate	85356 defghijk	5416 defgh	1440	1959	2362	
ORS 6203	84289 defghijk	5762 bcdefgh	2478	1786	3918	
0241 WA	82300 efghijk	6050 bcdefgh	3054	1268	2650	
Captivation	81145 fghijk	5704 cdefgh	2247	1786	1383	
Talca	77470 ghijk	5186 efgh	1037	807	2881	
Red Garnet	77265 ghijk	5243 defgh	2017	1671	3227	
ORS 6151	76603 ghijk	5704 cdefgh	1901	1729	2420	
7197	76513 ghijk	5416 defgh	2939	691	2420	
Cut Above	71930 hijk	5128 efgh	2593	864	2996	
Excursion	68884 hijk	4552 gh	2190	1037	2535	
Warrior	65409 ijk	4552 gh	864	1844	2535	
ORS 6064	53506 jk	4033 h	2132	1671	2650	
Eclipse	51057 k	4725 fgh	2132	1959	1325	
<i>p-value</i>	0.0049	0.014				
LSD _{0.05}	40705	2701				

Table 3. 2018 Seedless Watermelon Variety Trial: Varieties by Marketable II Yield (excluding fruit less than 9 lbs and over 24 lbs¹) in Lbs/a and Fruits/a and Fruits per Harvest

Variety	Yields and Harvest Distribution					
	Marketable II lbs/a	Marketable II Fruits/a	Fruits per harvest			
			Harvest 1 79 DAT	Harvest 2 99 DAT	Harvest 3 120 DAT	
Paradigm	130490 a	8989 a	2362	2939	3688	
9601	126470 ab	9046 a	2650	2939	3457	
ORS 60599	122868 abc	8124 abc	2478	1729	3918	
Unbridled	120388 abcd	8182 abc	2535	1901	3745	
Maxima	118979 abcd	7318 abcde	2190	1037	4091	
ORS 6181 B	118855 abcd	7836 abcd	2190	1729	3918	
Crunchy Red	115297 abcde	8355 ab	3342	2362	2650	
Embassy	106606 abcdef	7318 abcde	1613	2362	3342	
Charismatic	105481 abcdefg	7087 abcdef	2132	2420	2535	
7187	101439 abcdefg	6799 abcdef	2017	1556	3227	
Summer Breeze	98684 abcdefg	6857 abcdef	2362	1613	2881	
Road Trip	97807 abcdefg	6453 abcdefg	2593	864	2996	
Premont	97645 abcdefg	6972 abcdef	3054	1268	2650	
Secretariat	96624 abcdefg	6972 abcdef	2305	1729	2939	
Fascination	92604 abcdefgh	6453 abcdefg	2132	1671	2650	
Kingman	92319 abcdefgh	6396 abcdefg	2362	1325	2708	
Red Amber	88873 bcdefghi	6050 bcdefg	2939	691	2420	
Joy Ride	87394 bcdefghi	5531 cdefg	1844	1325	2362	
Troubadour	87185 bcdefghi	6799 abcdef	1901	1210	3688	
ORS 6260 D	86532 bcdefghi	5704 bcdefg	2190	980	2535	
Turnpike	86518 bcdefghi	5762 bcdefg	2190	1383	2190	
Tailgate	85356 cdefghi	5416 defg	2074	1556	1786	
ORS 6203	84289 cdefghi	5762 bcdefg	1440	1959	2362	
Wolverine	83664 cdefghi	5877 bcdefg	2362	1268	2247	
Bottle Rocket	83540 cdefghi	5301 defg	2247	1671	1383	
0241 WA	82300 cdefghi	6050 bcdefg	1901	1729	2420	
Captivation	81145 defghi	5704 bcdefg	864	1440	3400	
Talca	77470 efghi	5186 defg	2708	1325	1152	
Red Garnet	77265 efghi	5243 defg	864	1844	2535	
7197	76513 efghi	5416 defg	2132	1959	1325	
ORS 6151	74797 efghi	5647 cdefg	980	1844	2823	
Cut Above	71930 fghi	5128 efg	1498	1210	2420	
Excursion	67381 fghi	4494 fg	1844	807	1844	
Warrior	65409 ghi	4552 fg	2132	1037	1383	
ORS 6064	53506 hi	4033 g	807	1037	2190	
Eclipse	51057 i	4725 efg	1037	807	2881	
<i>p-value</i>	0.0095	0.02				
LSD_{0.05}	41112	2705				

Table 4. 2018 Seedless Watermelon Variety Trial: Percent of Total Harvested at Each Harvest by Number

Variety	Percent of Total Harvested at Each Harvest by Number		
	Harvest 1 79 DAT	Harvest 2 99 DAT	Harvest 3 120 DAT
Talca	52	26	22
Red Amber	49	11	40
Warrior	47	23	30
Premont	44	18	38
Excursion	42	18	41
Bottle Rocket	41	33	26
Crunchy Red	40	28	32
Wolverine	40	22	38
Road Trip	40	13	46
7197	39	36	24
Tailgate	38	29	33
ORS 6260 D	38	18	44
Turnpike	38	24	38
Kingman	37	21	42
Summer Breeze	34	24	42
Joy Ride	33	25	41
Secretariat	33	25	42
Fascination	33	26	41
0241 WA	31	29	40
Unbridled	31	24	45
ORS 60599	30	22	48
Charismatic	30	34	36
Maxima	29	17	54
9601	29	32	38
Cut Above	29	24	47
7187	29	24	47
ORS 6181 B	28	22	50
Troubadour	28	18	54
Paradigm	26	33	41
ORS 6203	25	34	41
Eclipse	22	17	61
Embassy	22	33	45
ORS 6064	20	26	54
ORS 6151	17	33	49
Red Garnet	16	35	48
Captivation	15	25	60

Table 5. 2018 Seedless Watermelon Variety Trial: Varieties by Average Fruit Weight and Percent of Fruit in Each Size Class

Variety	Mean Marketable I Weight (lbs)	Percent of Fruit in Each Size Class			
		30 Count 21.5 lbs plus	36 Count 17.6-21.4 lbs	45 Count 13.6-17.5 lbs	60 Count 9.0-13.5 lbs
Maxima	16.7 a	12.0	21.8	45.9	20.3
Joy Ride	16.2 ab	10.1	20.2	41.4	28.3
Bottle Rocket	16.0 abc	7.4	23.4	40.4	28.7
Tailgate	15.8 bcd	8.5	19.1	43.6	28.7
ORS 6260 D	15.3 cde	5.0	17.0	47.0	31.0
ORS 6181 B	15.2 cde	4.4	9.5	59.9	26.3
ORS 60599	15.2 def	2.8	17.6	44.4	35.2
Road Trip	15.2 defg	1.8	16.1	51.8	30.4
Excursion	15.1 cdefgh	2.5	13.9	50.6	32.9
7187	15.1 defgh	5.0	13.3	41.7	40.0
Turnpike	15.0 defghi	4.0	15.0	52.0	29.0
Talca	14.9 defghij	4.4	15.6	46.7	33.3
Charismatic	14.9 efg hij	2.4	17.9	47.2	32.5
Unbridled	14.8 efg hijk	2.8	16.1	43.4	37.8
Red Garnet	14.7 efg hijklm	3.3	7.7	56.0	33.0
Red Amber	14.7 efg hijklm	1.0	14.3	47.6	37.1
Embassy	14.7 efg hijkl	2.3	11.7	49.2	36.7
ORS 6203	14.6 efg hijklmn	2.0	18.0	41.0	39.0
Summer Breeze	14.6 efg hijklmn	4.1	14.0	36.4	45.5
Paradigm	14.6 efg hijklm	2.5	11.5	49.7	36.3
Wolverine	14.5 fghijk lmn	1.9	13.5	46.2	38.5
Kingman	14.4 ghijkl mn	0.9	13.5	46.8	38.7
Warrior	14.4 ghijkl mn o	0.0	12.7	48.1	39.2
Fascination	14.3 hijkl mn o	0.0	12.5	48.2	39.3
Captivation	14.2 ijkl mn op	0.0	2.0	66.7	31.3
7197	14.1 jkl mn op q	3.2	5.3	44.7	46.8
Cut Above	14.0 klmn op q	1.1	5.6	46.1	47.2
Premont	14.0 lm n op q	1.7	8.3	43.8	46.3
9601	14.0 mn op q	0.0	8.3	51.6	40.1
Crunchy Red	13.9 nop q	1.4	4.1	50.7	43.8
Secretariat	13.9 nop q	0.0	3.3	52.1	44.6
0241 WA	13.6 opqr	0.0	3.8	46.7	49.5
ORS 6151	13.4 pqr	3.0	2.0	40.4	54.5
ORS 6064	13.3 qr	0.0	4.3	40.0	55.7
Troubadour	12.9 r	0.8	3.4	31.1	64.7
Eclipse	10.8 s	0.0	1.2	7.3	91.5
p-value	<0.0001				
LSD 0.05	1.2				

Table 6. 2018 Seedless Watermelon Variety Trial: No. of Fruit per Acre in Each Size Class

Variety	Mean Marketable I Weight (lbs)	No/A of Fruit in Each Size Class			
		30 Count 21.5 lbs plus	36 Count 17.6-21.4 lbs	45 Count 13.6-17.5 lbs	60 Count 9.0-13.5 lbs
Maxima	16.7 a	922	1671	3515	1556
Joy Ride	16.2 ab	576	1152	2362	1613
Bottle Rocket	16.0 abc	403	1268	2190	1556
Tailgate	15.8 bcd	461	1037	2362	1556
ORS 6260 D	15.3 cde	288	980	2708	1786
ORS 6181 B	15.2 cde	346	749	4725	2074
ORS 60599	15.2 def	230	1440	3630	2881
Road Trip	15.2 defg	115	1037	3342	1959
Excursion	15.1 cdefgh	115	634	2305	1498
7187	15.1 defgh	346	922	2881	2766
Turnpike	15.0 defghi	230	864	2996	1671
Talca	14.9 defghij	230	807	2420	1729
Charismatic	14.9 efghij	173	1268	3342	2305
Unbridled	14.8 efghijk	230	1325	3572	3111
Red Garnet	14.7 efghijklm	173	403	2939	1729
Red Amber	14.7 efghijklm	58	864	2881	2247
Embassy	14.7 efghijkl	173	864	3630	2708
ORS 6203	14.6 efghijklmn	115	1037	2362	2247
Summer Breeze	14.6 efghijklmn	288	980	2535	3169
Paradigm	14.6 efghijklm	230	1037	4494	3284
Wolverine	14.5 fghijklmn	115	807	2766	2305
Kingman	14.4 ghijklmn	58	864	2996	2478
Warrior	14.4 ghijklmno	0	576	2190	1786
Fascination	14.3 hijklmno	0	807	3111	2535
Captivation	14.2 ijklmnop	0	115	3803	1786
7197	14.1 jklmnopq	173	288	2420	2535
Cut Above	14.0 klmnopq	58	288	2362	2420
Premont	14.0 lmnopq	115	576	3054	3227
9601	14.0 mnopq	0	749	4667	3630
Crunchy Red	13.9 nopq	115	346	4264	3688
Secretariat	13.9 nopq	0	230	3630	3111
0241 WA	13.6 opqr	0	230	2823	2996
ORS 6151	13.4 pqr	173	115	2305	3111
ORS 6064	13.3 qr	0	173	1613	2247
Troubadour	12.9 r	58	230	2132	4437
Eclipse	10.8 s	0	58	346	4321
<i>p</i> -value	<0.0001				
<i>LSD</i> 0.05	0.70				

Table 7. 2018 Seedless Watermelon Variety Trial: Varieties by Soluble Solid Content

Variety	% Soluble Solids
Joy Ride	10.91 a
ORS 6181 B	10.86 ab
ORS 60599	10.83 abc
Red Garnet	10.78 abcd
Road Trip	10.73 abcd
Maxima	10.72 abcd
ORS 6151	10.71 abcde
Summer Breeze	10.66 abcde
Fascination	10.66 abcde
Warrior	10.63 abcde
Bottle Rocket	10.59 abcde
Charismatic	10.59 abcde
Crunchy Red	10.57 abcde
ORS 6260 D	10.56 abcde
Red Amber	10.56 abcde
Paradigm	10.55 abcdef
Talca	10.53 abcdef
Turnpike	10.50 abcdef
Kingman	10.48 abcdef
Troubadour	10.43 abcdef
0241 WA	10.42 abcdef
Wolverine	10.42 abcdef
Cut Above	10.42 abcdef
7187	10.40 abcdef
Unbridled	10.39 abcdef
Captivation	10.34 abcdef
7197	10.34 abcdef
Tailgate	10.28 abcdef
ORS 6203	10.26 abcdefg
Embassy	10.25 bcdef
Secretariat	10.19 cdefg
Premont	10.16 defg
Excursion	10.04 efgh
9601	9.91 fgh
ORS 6064	9.60 gh
Eclipse	9.51 h
<i>p-value</i>	<0.002
<i>LSD 0.05</i>	0.65

Table 8. 2018 Seedless Watermelon Variety Trial: Hollow Heart (HH) Severity Rating (1 = no HH, 2 = minor HH, 3 moderate HH, 4 = major HH, 5 = Severe HH)

Variety	Hollow Heart Severity Rating (mean)		Percent Hollow Heart By Severity Rating			
			2	3	4	5
0241 WA	2.47	a	33	11	22	6
7197	2.31	ab	17	8	33	0
Unbridled	2.19	abc	6	25	13	6
ORS 6151	2.15	abcd	33	20	13	0
ORS 6181 B	2.13	abcd	6	12	12	12
7187	1.99	abcde	0	29	6	6
Charismatic	1.94	abcdef	13	6	6	13
Kingman	1.88	bcd ^e f ^g	31	6	6	6
9601	1.85	bcd ^e f ^g	15	0	15	5
Tailgate	1.81	bcd ^e f ^g h	12	18	12	0
Warrior	1.76	bcd ^e f ^g h <i>i</i>	17	11	6	6
Turnpike	1.63	cdefghij	19	13	6	0
Cut Above	1.58	defghijk	24	6	0	6
Secretariat	1.57	defghijk	25	6	6	0
Wolverine	1.52	efghijk	18	18	0	0
Bottle Rocket	1.50	efghijk	13	19	0	0
ORS 6064	1.50	efghijk	13	0	13	0
Red Amber	1.40	fghijk	26	0	0	4
Joy Ride	1.32	ghijk	19	6	0	0
Troubadour	1.31	fghijk	17	8	0	0
Red Garnet	1.29	ghijk	13	7	0	0
Eclipse	1.28	hijk	17	6	0	0
Road Trip	1.25	hijk	13	6	0	0
ORS 60599	1.19	ijk	6	6	0	0
Embassy	1.18	jk	18	0	0	0
Summer Breeze	1.18	jk	6	6	0	0
Captivation	1.17	jk	18	0	0	0
ORS 6203	1.13	jk	0	6	0	0
ORS 6260 D	1.12	jk	11	0	0	0
Premont	1.09	jk	10	0	0	0
Excursion	1.07	jk	6	0	0	0
Fascination	1.07	jk	6	0	0	0
Maxima	1.07	jk	6	0	0	0
Paradigm	1.07	jk	6	0	0	0
Crunchy Red	1.06	jk	0	5	0	0
Talca	1.00	k	0	0	0	0
<i>p-value</i>	0.0001					
<i>LSD 0.05</i>	0.57					

Table 9. 2018 Seedless Watermelon Variety Trial: Percent of Sampled Fruit Above Standard for Mature Seeds*

Variety	% Above Standard for Mature Seeds
Captivation	5
ORS 6181 B	6
Secretariat	6
Talca	6
Turnpike	6
0241 WA	6
Summer Breeze	11
ORS 6151	12
7187	13
Charismatic	18
Premont	19
Kingman	25
Fascination	31
Paradigm	50

* the USDA standard for seedless watermelons: “Watermelons of a size greater than ten (10) pounds may have 4 or fewer mature seeds, not to include pips/caplets, on the face of the melon which has been cut into four equal sections (one lengthwise cut and one crosswise cut)”

APPENDIX A:

Photographs and Characteristics of Varieties in the 2018 Seedless Watermelon Variety Trial



Varieties from the 2018 Seedless Watermelon Trial

	Variety* Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Paradigm 131904 (1) 130490 (1) 9046 10.4 3-11-50-36 10.5 Sostena
	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Maxima 128276 (2) 118979 (5) 7663 16.7 12-22-46-20 10.3 Origene
	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	9601 126470 (3) 126470 (2) 9046 14.0 0-8-52-40 9.9 Nunhems
Photo Not Available	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	ORS 60599 124292 (4) 122868 (3) 8182 15.2 3-18-44-35 10.4 Origene

*Company Photo

Varieties from the 2018 Seedless Watermelon Trial

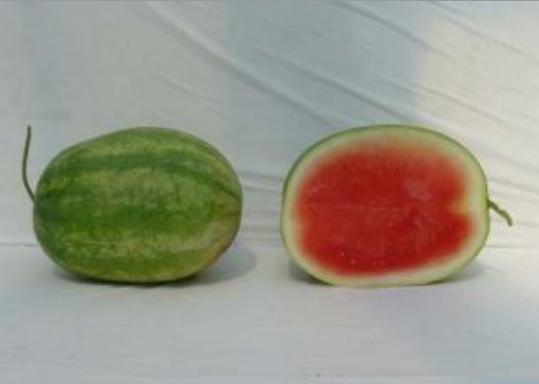
 <p>Unbridled</p>	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Unbridled 121867 (5) 120388 (4) 8240 14.8 3-16-43-38 10.4 Sakata
	Variety* Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	ORS 6181 120354 (6) 118855 (6) 7894 15.2 4-9-60-26 10.6 Origene
 <p>Crunchy Red</p>	Standard Check Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Crunchy Red 116774 (7) 115297 (7) 8412 13.9 1-4-51-44 10.3 HM Clause
 <p>Embassy</p>	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Embassy 108324 (8) 106606 (8) 7375 14.7 2-12-49-37 10.6 Nunhems

*Company Photo

Varieties from the 2018 Seedless Watermelon Trial

	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Charismatic 105481 (9) 105481 (9) 7087 14.9 2-18-4-33 10.6 Sakata
	Standard Check Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	7187 104405 (7) 101439 (7) 6914 15.1 5-13-42-40 10.4 Nunhems
	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Summer Breeze 101692 (11) 98684 (11) 6972 14.6 4-14-36-45 10.7 Seminis
	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Road Trip 97807 (12) 97807 (12) 6453 15.2 2-16-52-30 10.7 Seminis

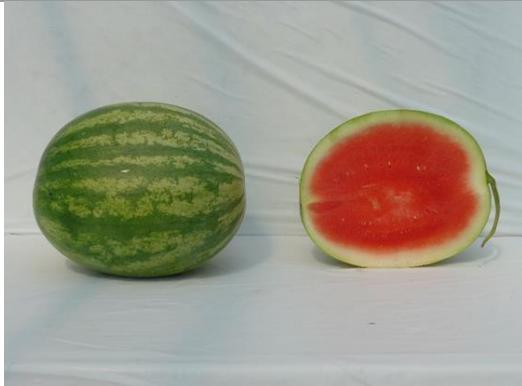
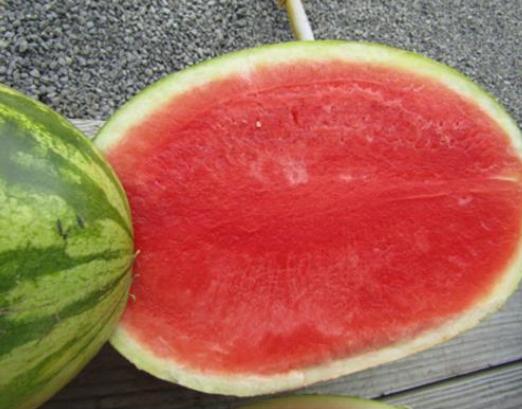
Varieties from the 2018 Seedless Watermelon Trial

	Variety Premont Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering
	Variety Secretariat Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering
	Standard Check Variety Fascination Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering
	Variety Kingman Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering

Varieties from the 2018 Seedless Watermelon Trial

 <p>Joy Ride</p>	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Joy Ride 92262 (17) 87394 (18) 5704 16.2 10-20-41-28 10.7 Seminis
	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Red Amber 88873 (18) 88873 (17) 6050 14.7 1-14-48-37 10.9 Enza Zaden
	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Troubadour 88642 (19) 87185 (19) 6857 12.9 1-3-31-65 10.4 HM Clause
	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	ORS 6260 D 88181 (20) 86532 (20) 5762 15.3 5-17-47-31 10.5 Origene

Varieties from the 2018 Seedless Watermelon Trial

	<p>Variety</p> <table> <tbody> <tr><td>Marketable I Yield lbs/a</td><td>Wolverine</td></tr> <tr><td>Marketable II Yield lbs/a</td><td>86616 (21)</td></tr> <tr><td>Fruits per Acre</td><td>83664 (24)</td></tr> <tr><td>Mean Weight lbs</td><td>5992</td></tr> <tr><td>Count 30-36-45-60 %</td><td>14.5</td></tr> <tr><td>Soluble Solids</td><td>2-13-46-38</td></tr> <tr><td>Company Entering</td><td>10.4</td></tr> <tr><td></td><td>Highmark</td></tr> </tbody> </table>	Marketable I Yield lbs/a	Wolverine	Marketable II Yield lbs/a	86616 (21)	Fruits per Acre	83664 (24)	Mean Weight lbs	5992	Count 30-36-45-60 %	14.5	Soluble Solids	2-13-46-38	Company Entering	10.4		Highmark
Marketable I Yield lbs/a	Wolverine																
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	Highmark																
	<p>Variety</p> <table> <tbody> <tr><td>Marketable I Yield lbs/a</td><td>Bottle Rocket</td></tr> <tr><td>Marketable II Yield lbs/a</td><td>86527 (22)</td></tr> <tr><td>Fruits per Acre</td><td>83540 (25)</td></tr> <tr><td>Mean Weight lbs</td><td>5416</td></tr> <tr><td>Count 30-36-45-60 %</td><td>16.0</td></tr> <tr><td>Soluble Solids</td><td>7-23-40-29</td></tr> <tr><td>Company Entering</td><td>10.7</td></tr> <tr><td></td><td>Seminis</td></tr> </tbody> </table>	Marketable I Yield lbs/a	Bottle Rocket	Marketable II Yield lbs/a	86527 (22)	Fruits per Acre	83540 (25)	Mean Weight lbs	5416	Count 30-36-45-60 %	16.0	Soluble Solids	7-23-40-29	Company Entering	10.7		Seminis
Marketable I Yield lbs/a	Bottle Rocket																
Marketable II Yield lbs/a	86527 (22)																
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Soluble Solids	7-23-40-29																
Company Entering	10.7																
	Seminis																
	<p>Variety</p> <table> <tbody> <tr><td>Marketable I Yield lbs/a</td><td>Turnpike</td></tr> <tr><td>Marketable II Yield lbs/a</td><td>86518 (23)</td></tr> <tr><td>Fruits per Acre</td><td>86518 (21)</td></tr> <tr><td>Mean Weight lbs</td><td>5762</td></tr> <tr><td>Count 30-36-45-60 %</td><td>15.0</td></tr> <tr><td>Soluble Solids</td><td>4-15-5-29</td></tr> <tr><td>Company Entering</td><td>10.5</td></tr> <tr><td></td><td>HM Clause</td></tr> </tbody> </table>	Marketable I Yield lbs/a	Turnpike	Marketable II Yield lbs/a	86518 (23)	Fruits per Acre	86518 (21)	Mean Weight lbs	5762	Count 30-36-45-60 %	15.0	Soluble Solids	4-15-5-29	Company Entering	10.5		HM Clause
Marketable I Yield lbs/a	Turnpike																
Marketable II Yield lbs/a	86518 (23)																
Fruits per Acre	86518 (21)																
Mean Weight lbs	5762																
Count 30-36-45-60 %	15.0																
Soluble Solids	4-15-5-29																
Company Entering	10.5																
	HM Clause																
	<p>Variety</p> <table> <tbody> <tr><td>Marketable I Yield lbs/a</td><td>Tailgate</td></tr> <tr><td>Marketable II Yield lbs/a</td><td>85356 (24)</td></tr> <tr><td>Fruits per Acre</td><td>85356 (22)</td></tr> <tr><td>Mean Weight lbs</td><td>5416</td></tr> <tr><td>Count 30-36-45-60 %</td><td>15.8</td></tr> <tr><td>Soluble Solids</td><td>9-19-44-29</td></tr> <tr><td>Company Entering</td><td>10.3</td></tr> <tr><td></td><td>Seminis</td></tr> </tbody> </table>	Marketable I Yield lbs/a	Tailgate	Marketable II Yield lbs/a	85356 (24)	Fruits per Acre	85356 (22)	Mean Weight lbs	5416	Count 30-36-45-60 %	15.8	Soluble Solids	9-19-44-29	Company Entering	10.3		Seminis
Marketable I Yield lbs/a	Tailgate																
Marketable II Yield lbs/a	85356 (24)																
Fruits per Acre	85356 (22)																
Mean Weight lbs	5416																
Count 30-36-45-60 %	15.8																
Soluble Solids	9-19-44-29																
Company Entering	10.3																
	Seminis																

Varieties from the 2018 Seedless Watermelon Trial

	Variety* ORS 6203 Marketable I Yield lbs/a 84289 (25) Marketable II Yield lbs/a 84289 (23) Fruits per Acre 5762 Mean Weight lbs 14.6 Count 30-36-45-60 % 2-18-41-39 Soluble Solids 10.8 Company Entering Origene	
	Variety 0241 WA Marketable I Yield lbs/a 82300 (26) Marketable II Yield lbs/a 82300 (26) Fruits per Acre 6050 Mean Weight lbs 13.6 Count 30-36-45-60 % 0-4-47-50 Soluble Solids 9.6 Company Entering Seminis	
 <i>Captivation</i>	Variety Captivation Marketable I Yield lbs/a 81145 (27) Marketable II Yield lbs/a 81145 (27) Fruits per Acre 5704 Mean Weight lbs 14.2 Count 30-36-45-60 % 0-2-67-31 Soluble Solids 10.7 Company Entering Syngenta	
	Variety Talca Marketable I Yield lbs/a 77470 (28) Marketable II Yield lbs/a 77470 (28) Fruits per Acre 5186 Mean Weight lbs 14.9 Count 30-36-45-60 % 4-16-47-33 Soluble Solids 10.5 Company Entering Sostena	

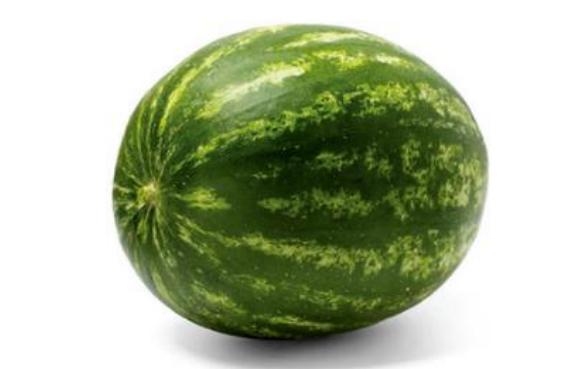
*Company Photo

Varieties from the 2018 Seedless Watermelon Trial

	Variety* Red Garnet Marketable I Yield lbs/a 77265 (29) Marketable II Yield lbs/a 77265 (29) Fruits per Acre 5243 Mean Weight lbs 14.7 Count 30-36-45-60 % 3-8-56-33 Soluble Solids 10.9 Company Entering Enza Zaden
	Variety ORS 6151 Marketable I Yield lbs/a 76603 (30) Marketable II Yield lbs/a 74797 (31) Fruits per Acre 5704 Mean Weight lbs 13.4 Count 30-36-45-60 % 3-2-40-55 Soluble Solids 10.3 Company Entering Origene
	Variety 7197 Marketable I Yield lbs/a 76513 (31) Marketable II Yield lbs/a 76513 (30) Fruits per Acre 5416 Mean Weight lbs 14.1 Count 30-36-45-60 % 3-5-45-47 Soluble Solids 10.6 Company Entering Nunhems
	Variety Cut Above Marketable I Yield lbs/a 71930 (32) Marketable II Yield lbs/a 71930 (32) Fruits per Acre 5128 Mean Weight lbs 14.0 Count 30-36-45-60 % 1-6-46-47 Soluble Solids 10.5 Company Entering Clifton

*Company Photo

Varieties from the 2018 Seedless Watermelon Trial

	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Excursion 68884 (33) 67381 (33) 4552 15.1 3-14-51-33 10.2 Syngenta
	Variety Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Warrior 65409 (34) 65409 (34) 4552 14.4 0-13-48-39 10.6 Nunhems
	Variety* Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	ORS 6064 53506 (35) 53506 (35) 4033 13.3 0-4-40-56 10.6 Origene
	Variety* Marketable I Yield lbs/a Marketable II Yield lbs/a Fruits per Acre Mean Weight lbs Count 30-36-45-60 % Soluble Solids Company Entering	Eclipse 51057 (36) 51057 (36) 4725 10.8 0-1-7-91 10.8 Sakata

*Company Photo

APPENDIX B:
Weather Summary for the 2018 Watermelon Variety Trial
May – September

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	
C	Max Temp			(°F)						J			(MJ.m ⁻² .day ⁻¹)	
D	Min Temp			(°F)						K			Avg Wind Speed	
E	GDD			(base 50 °F)						L			(mph)	
F	Avg RH			(%)						M			Rainfall	
G	Max RH			(%)						N			(in)	
H	Min RH			(%)						O			Ref ET	
													(in day ⁻¹)	
													Avg Soil Temp	
													([°] F)	
													Max Soil Temp	
													([°] F)	
													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)		