

## 2019 Watermelon Grafting and In-row Spacing Trial

**Location:** 4860 Geer Rd., Hughson

**Rootstocks:** RS841, Flexifort, UG29A+XSQ9901 (each planted as a half plot)

**Scions:** Fascination, 7187

**Pollinizer:** Wild Card Plus

**In-row plant spacing:** 3 feet (full population), 4 feet (25% reduction), 6 feet (50% reduction)

**Notes:** A pollinizer is placed after every three seedless plants (between the 3<sup>rd</sup> and 4<sup>th</sup> plant).

**Pollinizer arrangement:** 3-footer: XXXPXXXPXXXPX; 4-footer: XXXPXXXPX; 6-footer: XXXPXXXP

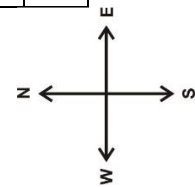
**Treatments:** 1-8: planting in 3 feet; 9-16: planting in 4 feet; 17-24: planting in 6 feet

1. Fascination/RS841; 2. Fascination/Flexifort; 3. Fascination/UG-XSQ9901; 4. Non-grafted Fascination; 5. 7187/RS841; 6. 7187/Flexifort; 7. 7187/UG-XSQ9901; 8. Non-grafted 7187

9. Fascination/RS841; 10. Fascination/Flexifort; 11. Fascination/UG-XSQ9901; 12. Non-grafted Fascination; 13. 7187/RS841; 14. 7187/Flexifort; 15. 7187/UG-XSQ9901; 16. Non-grafted 7187

17. Fascination/RS841; 18. Fascination/Flexifort; 19. Fascination/UG-XSQ9901; 20. Non-grafted Fascination; 21. 7187/RS841; 22. 7187/Flexifort; 23. 7187/UG-XSQ9901; 24. Non-grafted 7187

<b>REP 3</b>	5	<u>7</u>	6	8	4	2	1	<u>3</u>	<b>REP 4</b>	17	<u>19</u>	20	18	<u>23</u>	24	21	22
	10	<u>11</u>	9	12	14	13	16	<u>15</u>		4	1	<u>3</u>	2	8	<u>7</u>	5	6
	21	<u>23</u>	24	22	17	18	<u>19</u>	20		13	<u>15</u>	14	16	<u>11</u>	9	12	10
<b>REP 2</b>	<u>15</u>	16	13	14	<u>11</u>	9	12	10	<b>REP 1</b>	9	10	12	<u>11</u>	16	14	<u>15</u>	13
	22	24	21	<u>23</u>	20	18	17	<u>19</u>		<u>7</u>	8	5	6	<u>3</u>	1	2	4
	1	2	<u>3</u>	4	6	<u>7</u>	5	8		18	17	20	<u>19</u>	24	<u>23</u>	21	22



Field was transplanted by hand on 4/24/2019. There are 10, 7, and 5 plants per plot (30-ft) for spacings of 3 ft, 4 ft, and 6 ft, respectively. There are 3, 2, and 2 pollinizers for 3 ft, 4 ft, and 6 ft spacings.

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## Results of the First Harvest

So far, we have completed four harvests on July 24, August 7 and 23, and September 11, respectively. The yield and quality data from the first harvest have been analyzed and summarized here. More data will be processed and shared when they become available. The yield data include **average fruit weight**, **yield per plant**, **number of fruit per plant**, **total yield per acre**, and **total fruit number per acre**. The quality data include **fruit length and width**, **Brix**, **flesh firmness**, and **hollow heart rating**. Different spacings, scions, rootstocks, and their interactions were compared using the statistical software.

**Table 1. Significance table with corresponding P values of the main effects and interactions.**

	Avg. wt	Yield/plant	Fruit/plant	Total yield	Total number	Brix	Fruit length	Fruit width	Flesh firmness	Hollow heart
<b>Spacing</b>	0.01	<0.0001	<0.0001	0.0003	<0.0001	N/A	0.0184	0.04	N/A	N/A
<b>Scion</b>	<0.0001	N/A	0.0013	N/A	0.0004	N/A	0.0005	0.05	0.03	0.001
<b>Rootstock</b>	0.02	0.0007	0.0045	0.0014	0.0019	N/A	0.04	N/A	<0.0001	N/A
<b>Interaction</b>	N/A*	N/A	0.017	N/A	N/A	N/A	N/A	0.018	N/A	N/A
			(Spacing x Rootstock)					(Spacing x Rootstock)		

\*N/A indicates no significant difference was detected at P < 0.05.

**Table 2. Comparisons of the main effects on fruit yield and quality.**

	Avg. wt. (lb)	Yield/plant (lb)	Fruit/plant	Total wt. (tons/acre)	Total no. per acre	Brix	Length (in.)	Width (in.)	Firmness (psi)	Hollow heart
<b>3 feet</b>	20.7	64.2	3.2	66.5	6465	12.0	11.8	10.1	3.9	0.2
<b>4 feet</b>	21.3	88.3	4.3	68.6	6460	12.1	12.2	10.3	4.1	0.2
<b>6 feet</b>	21.9	112.7	5.2	58.4	5365	12.1	12.3	10.0	3.9	0.3
<b>7187</b>	20.0	87.1	4.4	63.9	6400	12.1	11.9	10.0	4.1	0.3
<b>Fascination</b>	22.6	89.6	4.0	65.1	5790	12.0	12.3	10.2	3.9	0.1
<b>Flexifort</b>	21.2	91.2	4.3	66.3	6250	12.0	12.3	10.1	4.1	<b>0</b>
<b>RS841</b>	22.2	95.2	4.3	68.8	6230	12.1	12.2	10.2	3.9	<b>0.2</b>
<b>UG29A</b>	20.6	<b>75.4</b>	<b>3.8</b>	<b>56.1</b>	<b>5470</b>	12.2	12.0	10.1	4.0	<b>0.3</b>
<b>XSQ9981</b>	21.5	<b>86.9</b>	4.2	63.8	<b>5975</b>	11.8	12.3	10.1	4.3	<b>0</b>
<b>Nongrafted</b>	20.9	93.1	4.5	67.7	6550	11.9	11.7	10.2	3.5	0.5

**Table 3. The overall grafting effects and effects of grafting when sorted by spacing and scion on yield and quality.**

	Avg. wt. (lb)	Yield/plant (lb)	Fruit/plant	Total wt. (tons/acre)	Total no. per acre	Brix	Length (in.)	Width (in.)	Firmness (psi)	Hollow heart
<b>Overall</b>										
Grafting	21.4	87.2	4.1	63.7	5980	12.1	12.2	10.1	4.1	<b>0.2</b>
Nongrafting	20.9	93.1	4.5	67.7	6550	11.9	11.7	10.2	3.5	<b>0.5</b>
<b>By spacing (3, 4, and 6 feet)</b>										
Grafting	21.0	63.9	3.1	66.2	6345	12.0	12.0	10.3	4.0	<b>0.1</b>
Nongrafting	19.6	65.3	3.4	67.7	6950	11.9	11.3	9.7	3.5	<b>0.6</b>
Grafting	21.4	86.9	4.2	<b>67.5</b>	<b>6320</b>	12.1	12.3	10.2	4.2	<b>0.2</b>
Nongrafting	20.9	93.9	4.6	73.0	7025	11.9	11.9	10.5	3.6	<b>0.4</b>
Grafting	22.0	<b>110.8</b>	5.1	57.5	5285	12.1	12.4	9.9	4.1	<b>0.2</b>
Nongrafting	22.1	120.0	5.5	62.2	5675	12.0	11.9	10.4	3.4	<b>0.4</b>
<b>By scion (7187 and Fascination)</b>										
Grafting	20.1	<b>85.5</b>	4.3	62.9	<b>6260</b>	12.2	12.0	10.0	4.2	<b>0.3</b>
Nongrafting	19.6	93.6	4.8	67.8	6970	11.8	11.5	10.1	3.6	<b>0.7</b>
Grafting	22.7	88.9	3.9	64.6	5705	11.9	12.4	10.2	4.0	<b>0</b>
Nongrafting	22.1	92.6	4.3	67.5	6130	12.1	11.9	10.3	3.5	<b>0.3</b>

**Italic-bold figures indicate values of the grafted plants are significantly lower than their corresponding nongrafted counterparts at P < 0.05.**

**Table 4. Comparisons of fruit productivity of each combination.**

	<b>Avg. wt. (lb)</b>	<b>Yield/plant (lb)</b>	<b>Total wt. (tons/acre)</b>	<b>Total no. per acre</b>
<b>3 feet - 7187</b>				
Flexifort	20.3	68.6	71.1	7000
RS841	19.2	68.7	71.2	7415
UG29A	19.7	60.1	62.4	6325
XSQ9981	20.0	62.2	64.5	6430
Nongrafted	18.7	67.3	69.8	7465
<b>3 feet - Fascination</b>				
Flexifort	22.2	64.0	66.4	5965
RS841	23.2	65.3	67.7	5810
UG29A	20.4	57.1	59.2	5810
XSQ9981	22.3	65.1	67.5	6015
Nongrafted	20.5	63.3	65.6	6430
<b>4 feet - 7187</b>				
Flexifort	20.2	80.2	62.3	6110
RS841	21.8	92.2	70.1	6440
UG29A	19.0	84.2	65.4	6900
XSQ9981	20.7	88.1	68.5	6705
Nongrafted	19.2	88.4	68.7	7165
<b>4 feet - Fascination</b>				
Flexifort	22.1	93.6	72.8	6610
RS841	23.7	93.2	72.4	6110
UG29A	22.2	75.0	58.3	5250
XSQ9981	21.9	90.4	70.3	6415
Nongrafted	22.5	99.5	77.4	6885
<b>6 feet - 7187</b>				
Flexifort	19.8	116.7	60.5	6065
RS841	21.2	119.0	61.7	5810
UG29A	19.4	81.6	42.3	4320
XSQ9981	19.8	106.5	55.2	5620
Nongrafted	20.8	125.1	64.9	6275
<b>6 feet - Fascination</b>				
Flexifort	22.4	124.4	64.5	5755
RS841	24.2	134.7	69.8	5810
UG29A	23.1	94.6	49.0	4235
XSQ9981	24.4	109.3	56.7	4665
Nongrafted	23.4	115.0	59.6	5080

**Table 5. Comparisons of fruit quality of each combination.**

	Brix	Length (in.)	Width (in.)	Firmness (psi)	Hollow heart
<b>3 feet - 7187</b>					
Flexifort	12.5	11.0	9.8	4.2	0.0
RS841	12.1	11.5	10.1	3.6	0.1
UG29A	12.3	11.7	10.5	4.1	0.0
XSQ9981	11.9	11.7	10.3	4.9	0.4
Nongrafted	11.6	11.0	9.6	3.5	0.8
<b>3 feet - Fascination</b>					
Flexifort	11.6	12.9	10.8	3.7	0.1
RS841	11.6	12.3	10.3	3.6	0.0
UG29A	12.2	12.5	10.4	3.8	0.0
XSQ9981	11.6	12.1	9.9	4.0	0.0
Nongrafted	12.2	11.6	9.8	3.6	0.5
<b>4 feet - 7187</b>					
Flexifort	12.0	12.4	10.7	4.0	0.0
RS841	12.3	12.1	10.2	4.3	1.0
UG29A	12.1	11.8	9.8	4.1	0.3
XSQ9981	12.1	12.2	10.2	4.4	0.0
Nongrafted	11.8	12.1	10.6	3.7	0.0
<b>4 feet - Fascination</b>					
Flexifort	11.9	12.6	10.0	3.9	0.0
RS841	12.1	12.4	10.3	4.0	0.0
UG29A	12.3	11.8	10.4	4.5	0.0
XSQ9981	11.8	12.8	10.3	4.3	0.0
Nongrafted	12.1	11.7	10.5	3.6	0.8
<b>6 feet - 7187</b>					
Flexifort	12.1	12.4	9.7	4.5	0.0
RS841	12.2	12.4	10.0	3.8	0.0
UG29A	12.6	11.8	9.4	4.0	1.7
XSQ9981	11.7	12.4	9.8	4.4	0.1
Nongrafted	12.1	11.4	10.0	3.6	0.1
<b>6 feet - Fascination</b>					
Flexifort	12.1	12.4	9.8	4.1	0.0
RS841	12.1	12.3	10.2	4.2	0.0
UG29A	12.0	12.6	10.2	3.7	0.0
XSQ9981	12.0	12.6	10.1	3.8	0.0
Nongrafted	11.9	12.4	10.7	3.2	0.8

## **Take-home message**

- 1. Fruit quality is more affected by grafting than productivity compared to nongrafted control.**
- 2. The rootstocks affect yield and quality differently even when grafting onto the same scion.**
- 3. Some grafted combinations grown in a wider spacing to expect a comparable yield is possible.**
- 4. Not all commercial cultivars are suitable for grafting.**
- 5. Grafting incompatibility may exist.**
- 6. Choosing the right combination is difficult. Evaluations of rootstock vigor and different scion-rootstock combinations are needed.**