

Post-harvest Storage Performance of Three Table Grape Cultivars: Gratitude, Faith, and Jupiter Under a High Tunnel System

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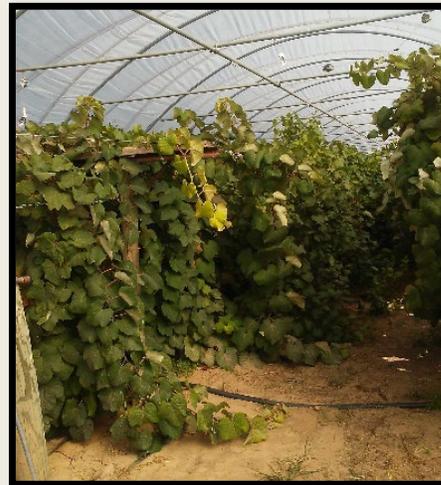
Objectives

Overall Project Objective:

To determine the feasibility of table grape production under high tunnels

My Project Objective:

To determine table grape grown under high tunnels marketable attributes through the evaluation of physiochemical, composition, and post-harvest attributes for high tunnel grapes



Postharvest Results



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Table 1. Main and interaction effects for composition of high tunnel table grape cultivars (Faith, Gratitude, and Jupiter) with different cluster thinning treatments (none and pea-sized berries) at harvest, Fayetteville, AR.

	2018			2019		
	Soluble solids (%)	pH	Titratable acidity (% tartaric)	Soluble solids (%)	pH	Titratable acidity (% tartaric)
Cultivar						
Faith	18.85a ^z	3.76a	0.47b	15.63 ^z	3.63b	0.52a
Gratitude	16.50b	3.43b	0.65a	15.95	3.61b	0.54a
Jupiter	17.35b	3.81a	0.49b	16.50	3.92a	0.39b
<i>P value</i>	0.0005	<0.0001	<0.0001	0.2279	0.0012	0.0001
Thinning						
None	18.03a	3.72a	0.53a	15.77	3.72	0.49
Pea	17.10b	3.61b	0.55a	16.29	3.61	0.47
<i>P value</i>	0.0209	0.0145	0.2891	0.2065	0.8923	0.3090
Cultivar x Thinning (<i>p value</i>)	0.1297	0.3040	0.2377	0.0004	0.0578	0.0151

^zCultivars were evaluated in triplicate (n=3). Means with different letter(s) for each attribute within effects are significantly different (p<0.05) using Tukey test.

Marketability Results



Photo by Kat Robinson



Photo by Kiran Patil

Table 2. Main and interaction effects for marketability attributes of high tunnel table grape cultivars (Faith, Gratitude, and Jupiter) with different cluster thinning treatments (none and pea-sized berries) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2018, 2019).

	2018			2019		
	Berry drop (%)	Decay (%)	Weight loss (%)	Berry drop (%)	Decay (%)	Weight loss (%)
Cultivar	0.0040 ^z	<0.0001	0.0010	0.0135	<0.0001	<0.0001
Thinning	NS ^y	0.0117	NS	<0.0001	NS	NS
Storage	0.0040	0.0007	<0.0001	NS	0.0724	<0.0001
Cultivar x thinning	NS	0.0123	0.0004	0.0036	NS	<0.0001
Storage x cultivar	NS	NS	0.0133	NS	NS	0.0002
Storage x thinning	NS	NS	NS	NS	NS	NS
Storage x cultivar x thinning	NS	NS	NS	NS	NS	0.0005

^yNS = not significant.

^zCultivars were evaluated in triplicate (n=3). Means with different letter(s) for each attribute within effects are significantly different (p<0.05) using Tukey test.

Interaction of Decay by Thinning

Fig. 1. Decay (%) of high tunnel grape cultivars (Faith, Gratitude, and Jupiter with different cluster thinning treatments (none and pea-sized berries) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2018).

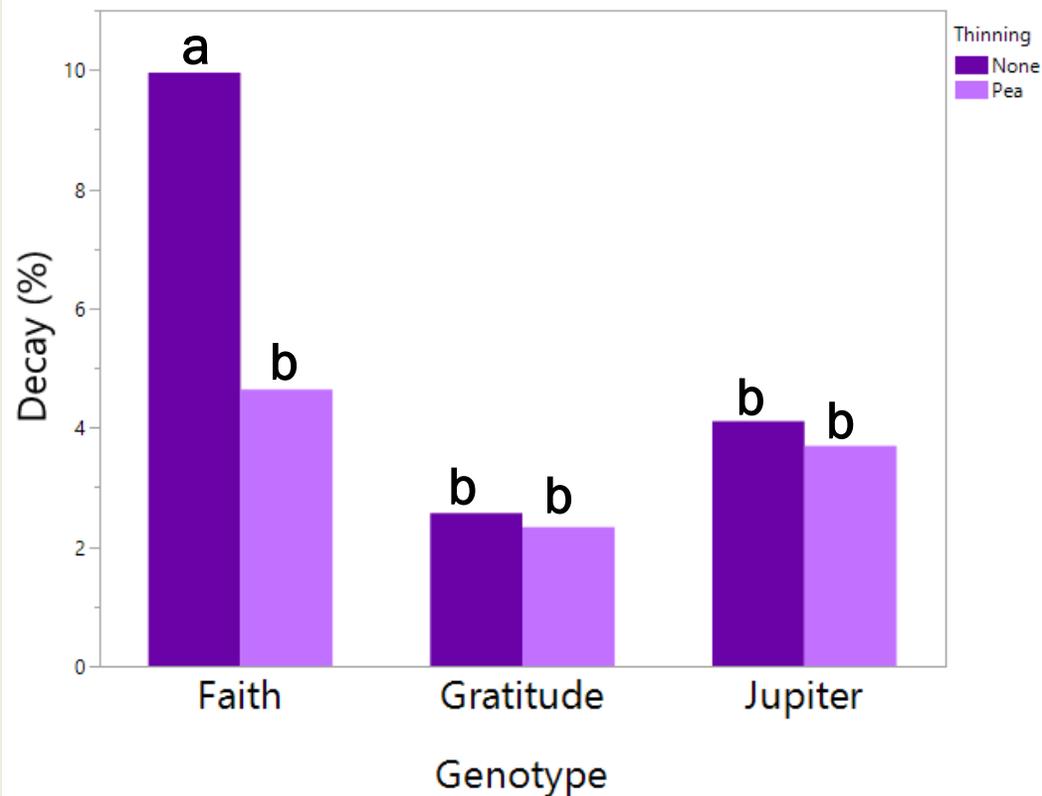
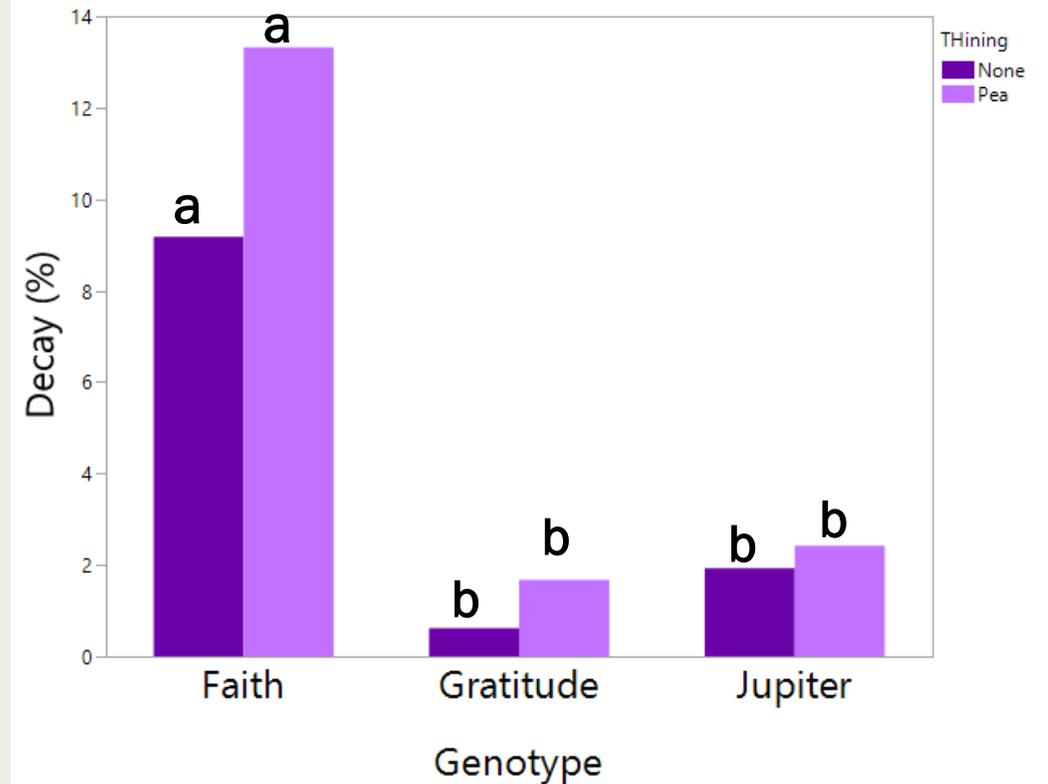


Fig. 2. Decay (%) of high tunnel grape cultivars (Faith, Gratitude, and Jupiter with different cluster thinning treatments (none and pea-sized berries) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2019).



Interaction of Weight Loss by Thinning

Fig. 3. Weight loss (%) of high tunnel grape cultivars (Faith, Gratitude, and Jupiter with different cluster thinning treatments (none and pea-sized berries) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2018).

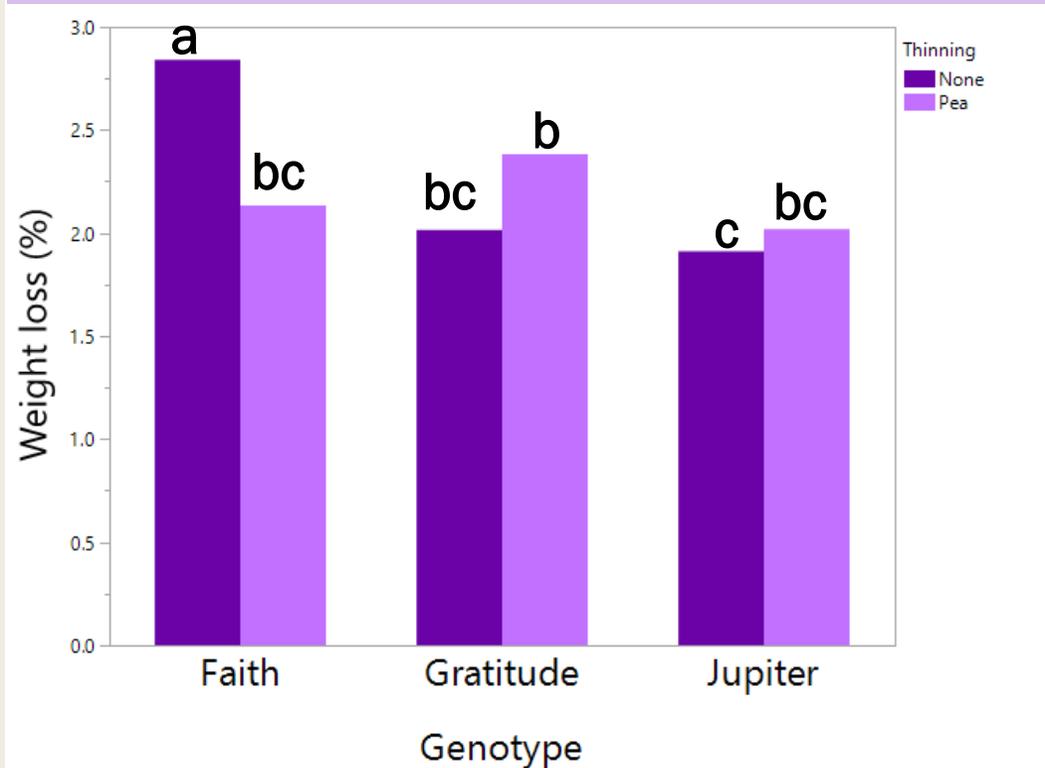
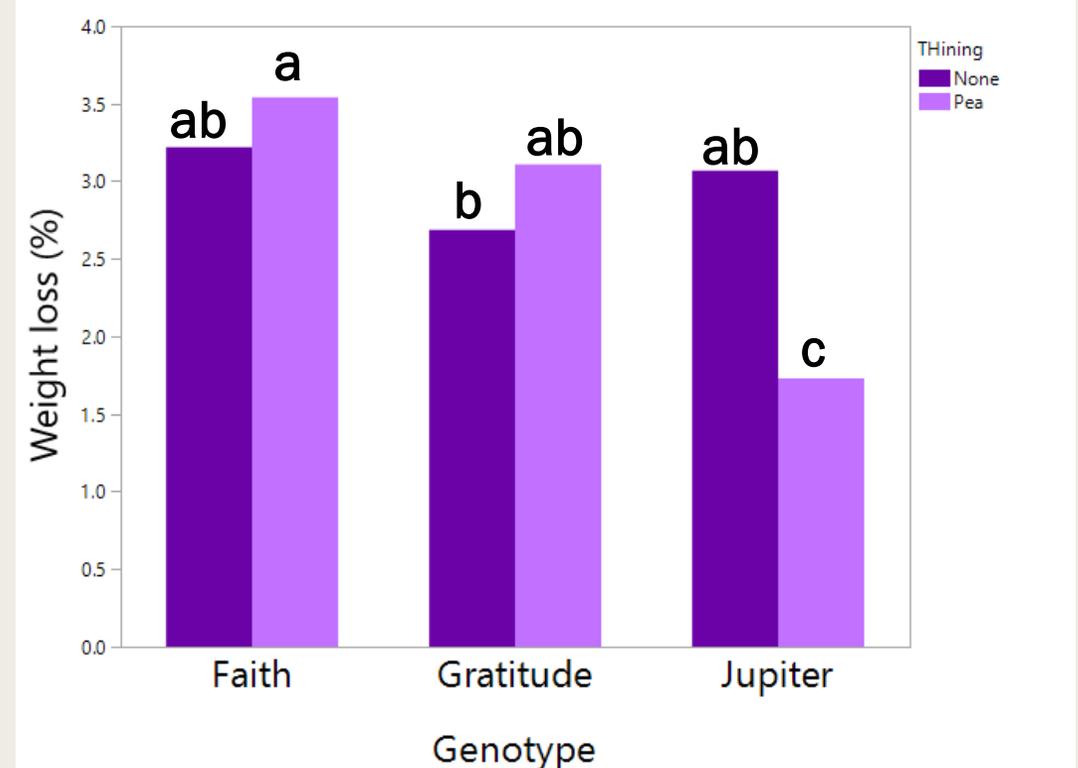


Fig. 4. Weight loss (%) of high tunnel grape cultivars (Faith, Gratitude, and Jupiter with different cluster thinning treatments (none and pea-sized berries) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2018).



Interaction of Weight Loss by Storage

Fig. 5. Weight loss (%) of high tunnel grape cultivars (Faith, Gratitude, and Jupiter) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2018).

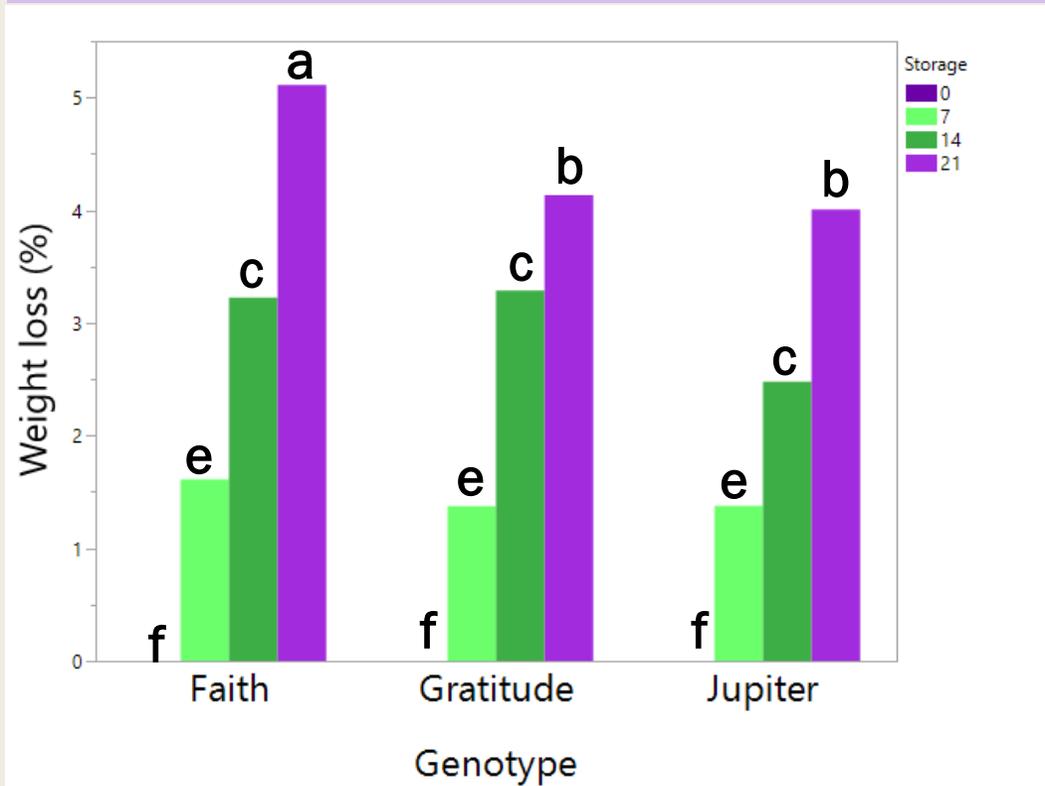
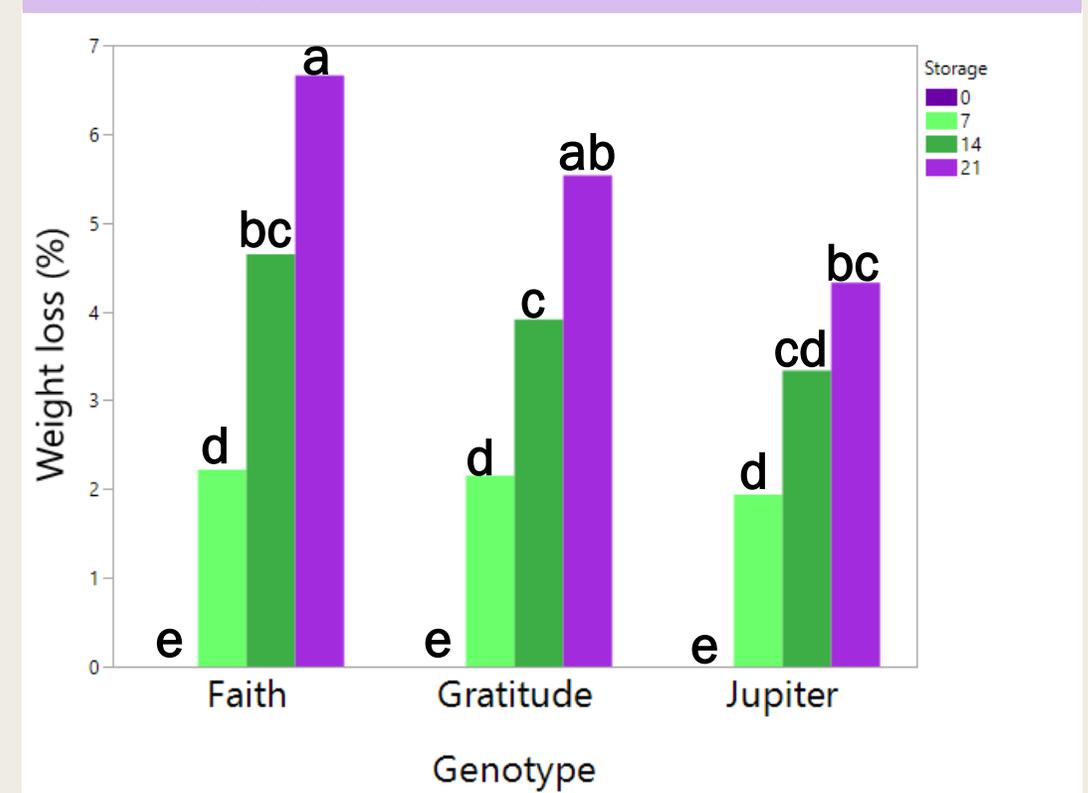


Fig. 6. Weight loss (%) of high tunnel grape cultivars (Faith, Gratitude, and Jupiter) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2019).



Conclusions

❖ Composition

- Cultivars differed in composition attributes at harvest (soluble solids, pH, TA)
- In 2018, thinning treatment groups had lower soluble solids and pH than non-thinned vines

❖ Marketability

- Decay was highest for Faith in both years
 - In 2018, decay was greater for non-thinned Faith vines
- Weight loss increased during storage for all cultivars
- Faith had the greatest weight loss in both years
 - In 2018, weight loss was highest for non-thinned Faith
 - In 2019, weight loss was highest for thinned Faith
- Berry drop varied by cultivar in both years
 - In 2019, berry drop was greater for thinned Jupiter vines

Projected Impacts

Based on this study, high tunnel technology can be useful for growers in southern region.

High Tunnel Benefits:

- ❖ Expanded Range of Viticulture
- ❖ Increased Potential for Local Food Production
- ❖ Higher Quality Grape Crops



Photo by Kiran Patil

Acknowledgements

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LS17-282: High Tunnel Grape Production Systems: A Novel Sustainable Approach to Growing Grapes

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