TWO YEAR STUDY OF MARKETABILITY ATTRIBUTES OF JUPITER TABLE GRAPE GROWN UNDER HIGH TUNNELS AT TWO LOCATIONS IN ARKANSAS

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Objectives

Overall Project Objective:
To determine the feasibility of table grape production under high tunnels

My Project Objective:
To evaluate the effects of cluster thinning on marketability attributes of table grapes grown in high tunnel systems

VS.

Photo by Dirk Langeveld

Postharvest Results

FineartbyFay.com

Fayetteville Composition at Harvest

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

	2018			2019		
	Soluble solids (%)	pH	Titratable acidity (% tartaric)	Soluble solids (%)	pH	Titratable acidity (% tartaric)
Thinning						
None	17.40[z]	3.83	0.49	17.77a	3.97	0.42
Pea-size	17.30	3.79	0.49	15.23b	3.86	0.36

[z]Cultivars were evaluated in triplicate (n=3). Means with different letter(s) for each attribute within effects are significantly different ($p<0.05$) using Students t-test.

Cabot Composition at Harvest

Table 2. Main and interaction effects for composition of high tunnel Jupiter table grapes with different cluster thinning treatments (none, pea-sized berries, and veraison) at Cabot, AR.

	2018			2019		
	Soluble solids (%)	pH	Titratable acidity (% tartaric)	Soluble solids (%)	pH	Titratable acidity (% tartaric)
Thinning						
None	17.07b[z]	3.87	0.53a	13.20	3.73	0.46
Pea-size	17.93ab	4.00	0.45b	14.73	3.87	0.39
Veraison	18.77a	3.97	0.46b	15.30	3.75	0.44

[z]Cultivars 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

Fayetteville Marketability Main Effects

Table 3. Main and interaction effects for marketability attributes of high tunnel Jupiter table grapes 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 (%)**
Thinning	NS[Z]	NS[Y]	NS	0.0002	NS	0.0015
Storage	NS	0.0052	<0.0001	NS	0.0002	<0.0001
Thinning x Storage	NS	NS	NS	NS	NS	NS

[Z]Cultivars 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.

Cabot Marketability Main Effects

Table 4. Main and interaction effects for marketability attributes of high tunnel Jupiter table grapes with different cluster thinning treatments (none, pea-sized berries, and veraison) stored at 2 °C for 0, 7, 14, and 21 d, Cabot, AR (2018, 2019).

	2018			2019		
	Berry drop (%)	**Decay (%)**	**Weight loss (%)**	**Berry drop (%)**	**Decay (%)**	**Weight loss (%)**
Thinning	<0.0001[z]	NS[y]	<0.0001	0.0003	NS	NS
Storage	NS	0.0001	<0.0001	NS	0.0170	<0.0001
Thinning x Storage	NS	NS	0.0384	NS	NS	NS

[y]NS = not significant.
[z]Cultivars 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.

Main Effects for Berry Drop in Fayetteville

Fig. 1. Berry drop (%) of high tunnel ‘Jupiter’ grapes with different cluster thinning treatments (none and pea-sized berries) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2018).

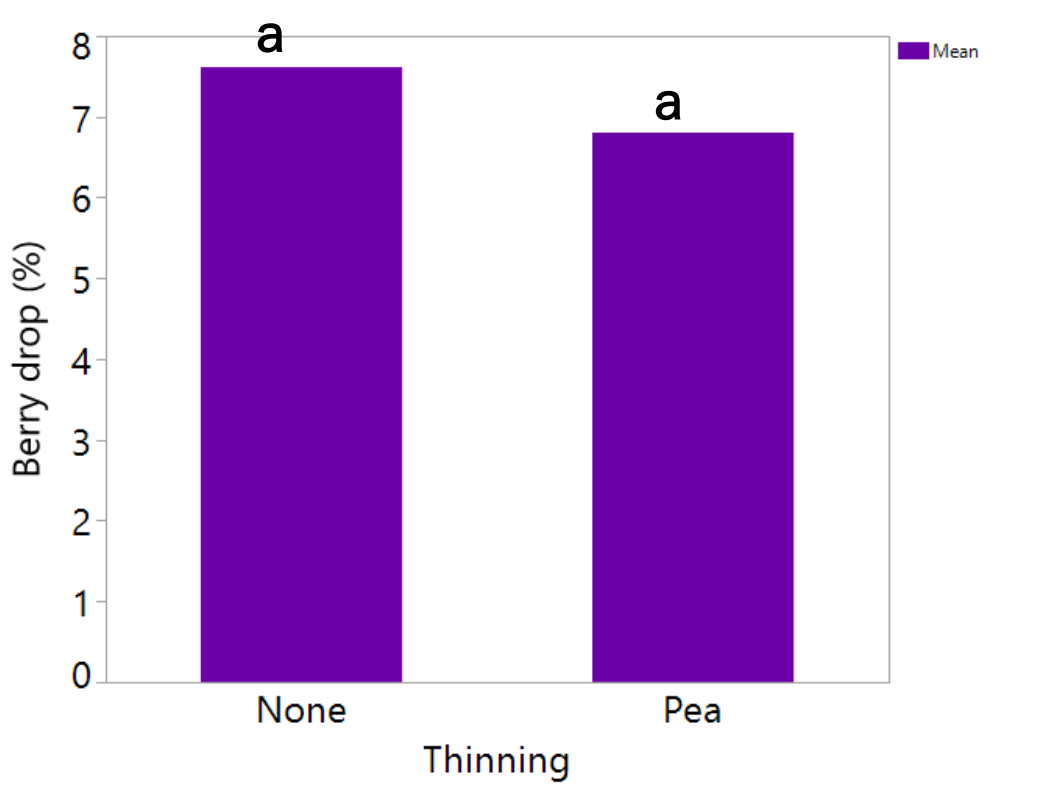
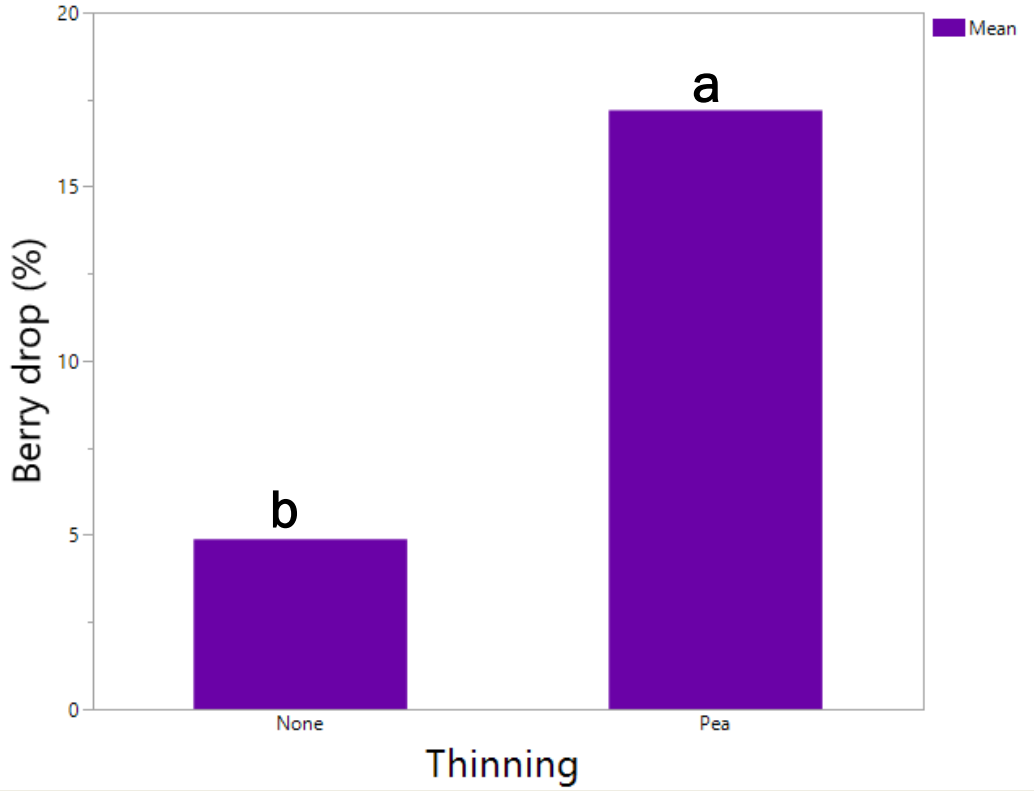


Fig. 2. Berry drop (%) of high tunnel ‘Jupiter’ grapes with different cluster thinning treatments (none and pea-sized berries) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2019).



Main Effects for Decay in Fayetteville

Fig. 3. Decay (%) of high tunnel ‘Jupiter’ grapes stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2018).

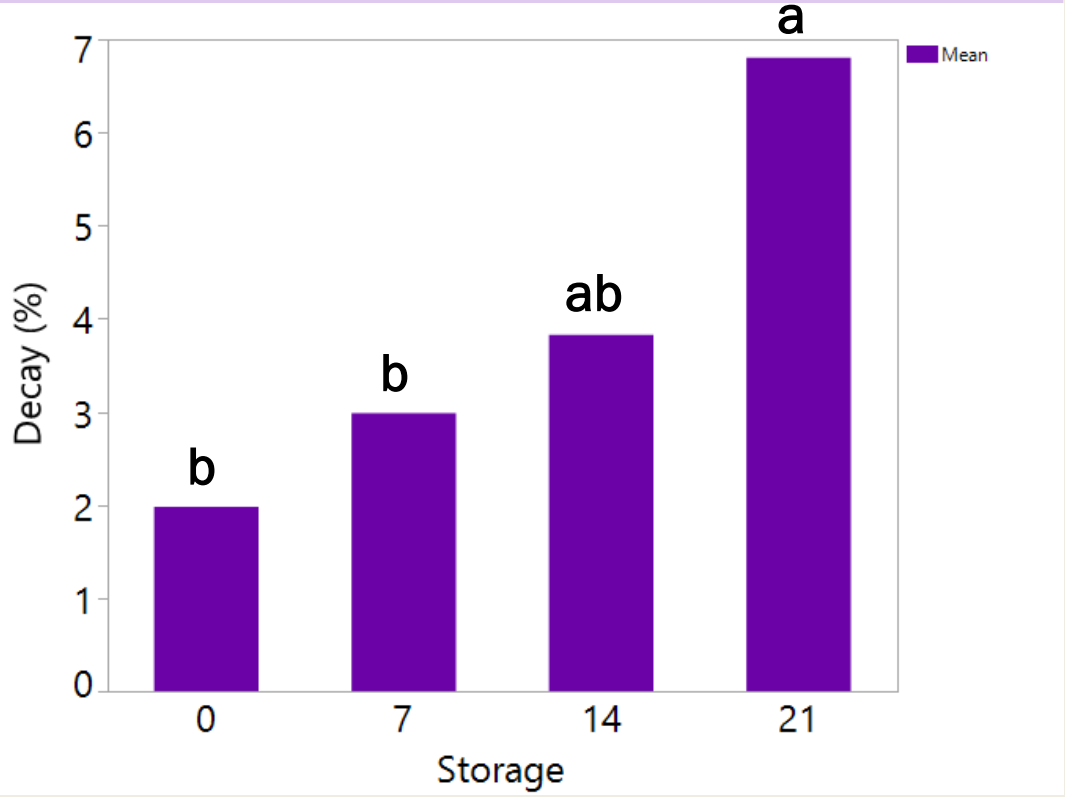
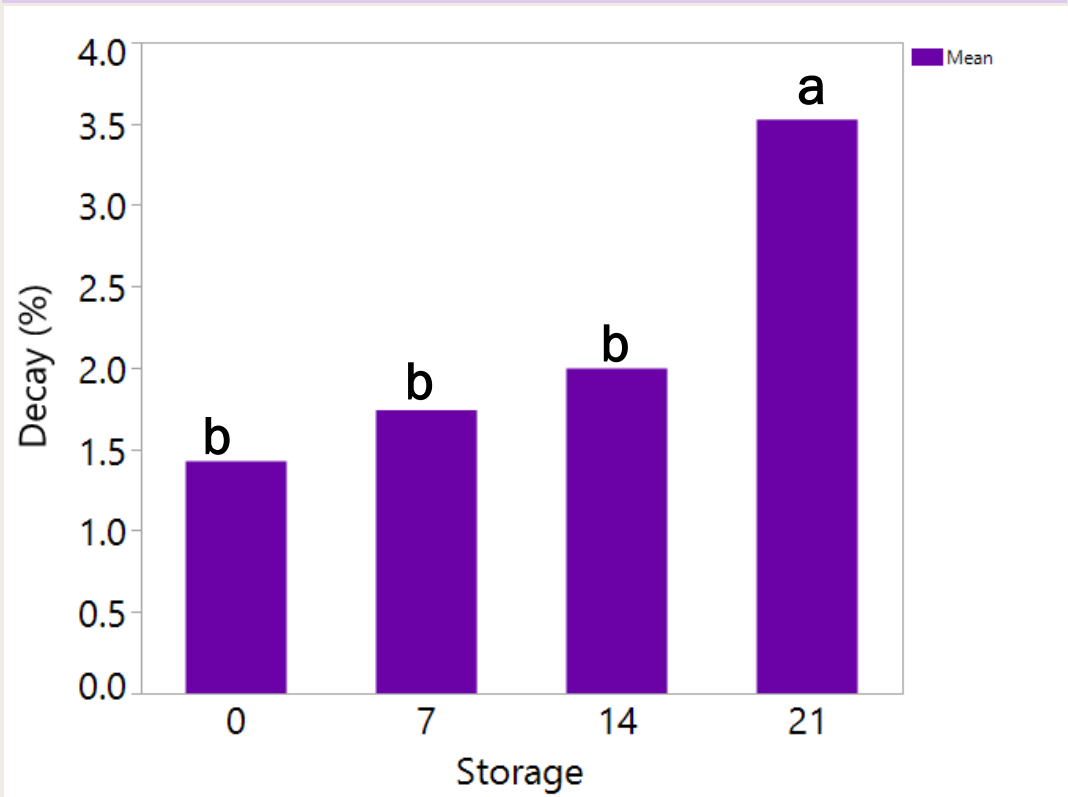


Fig. 4. Decay (%) of high tunnel ‘Jupiter’ grapes stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2019).



Main Effects for Weight Loss in Fayetteville

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

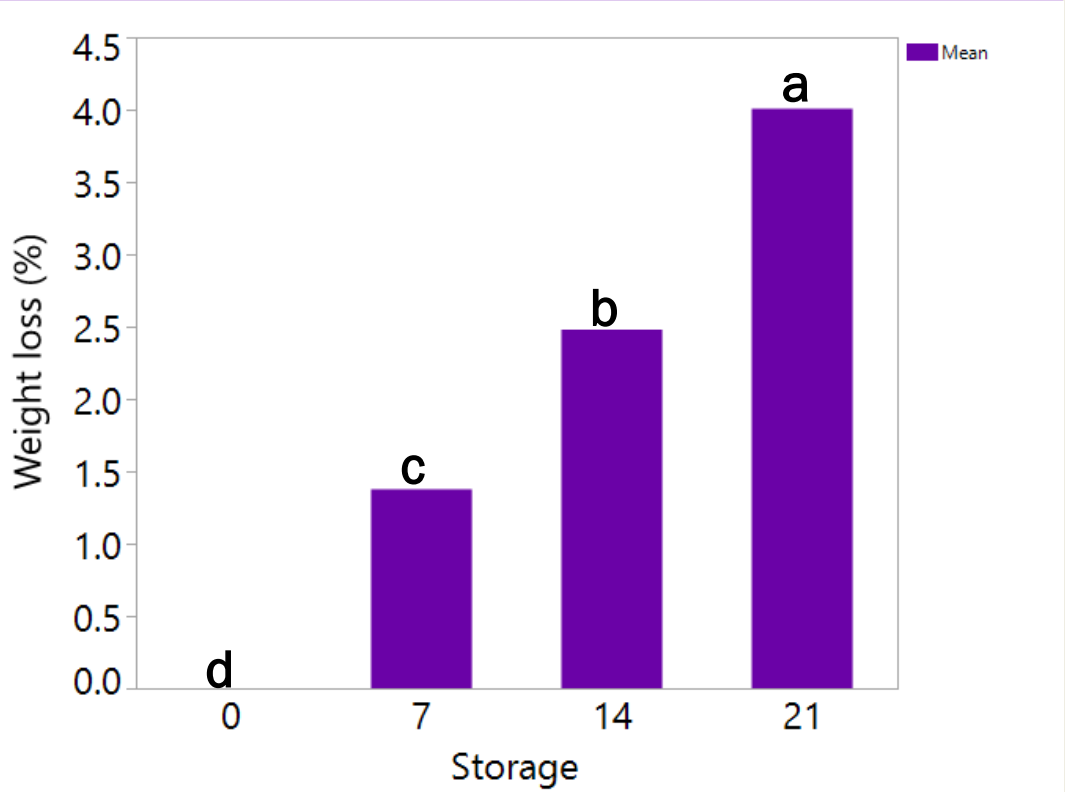
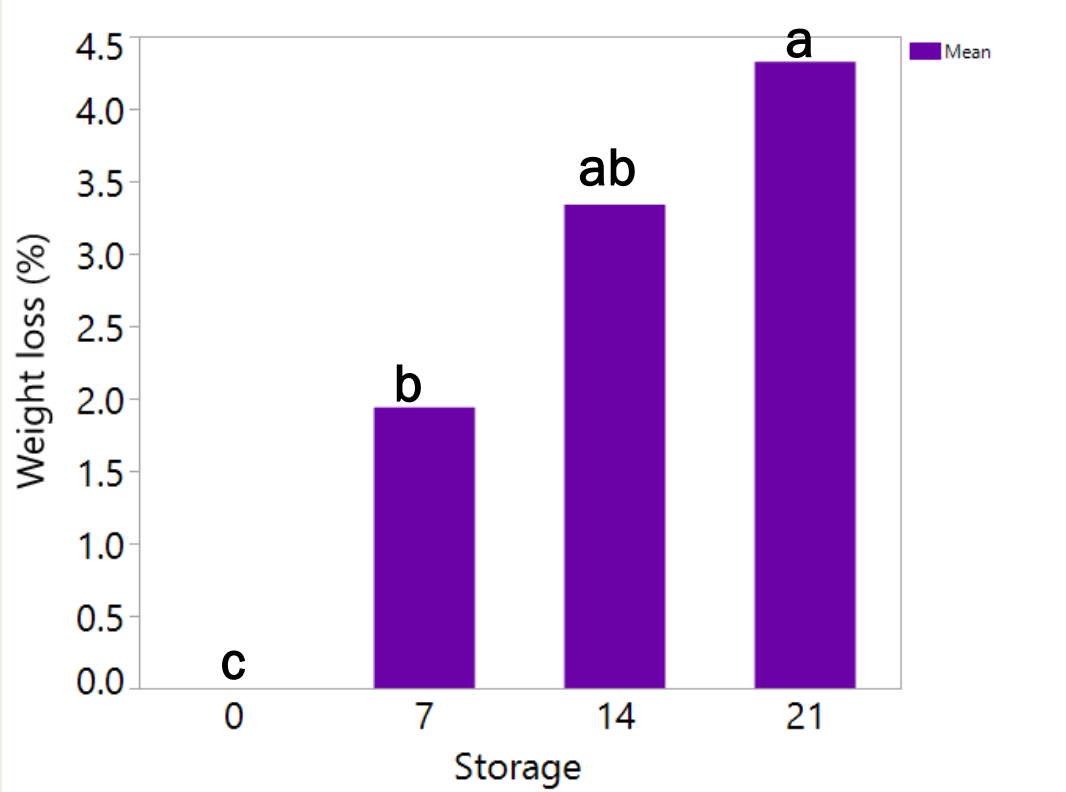


Fig. 8. Weight loss (%) of high tunnel ‘Jupiter’ grapes with different cluster thinning treatments (none and pea-sized berries) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2019).



Main Effects for Berry Drop in Cabot

Fig. 9. Berry drop (%) of high tunnel ‘Jupiter’ grapes with different cluster thinning treatments (none, pea-sized berries, and veraison) stored at 2 °C for 0, 7, 14, and 21 d, Cabot, AR (2018).

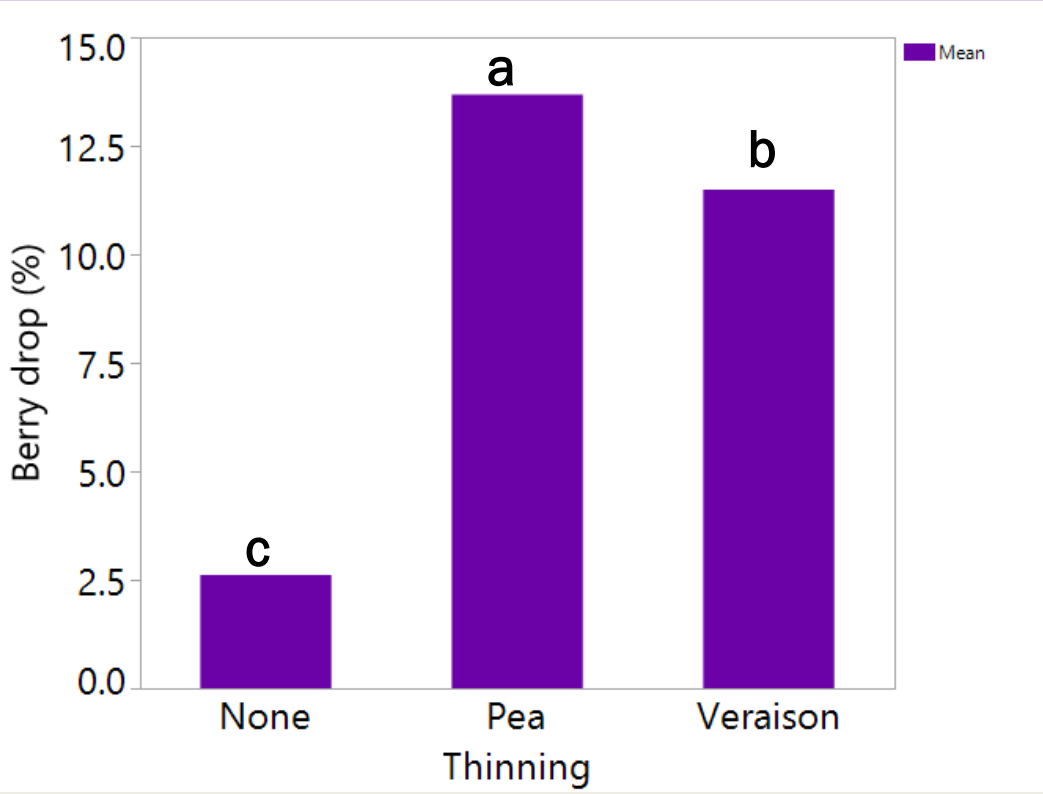
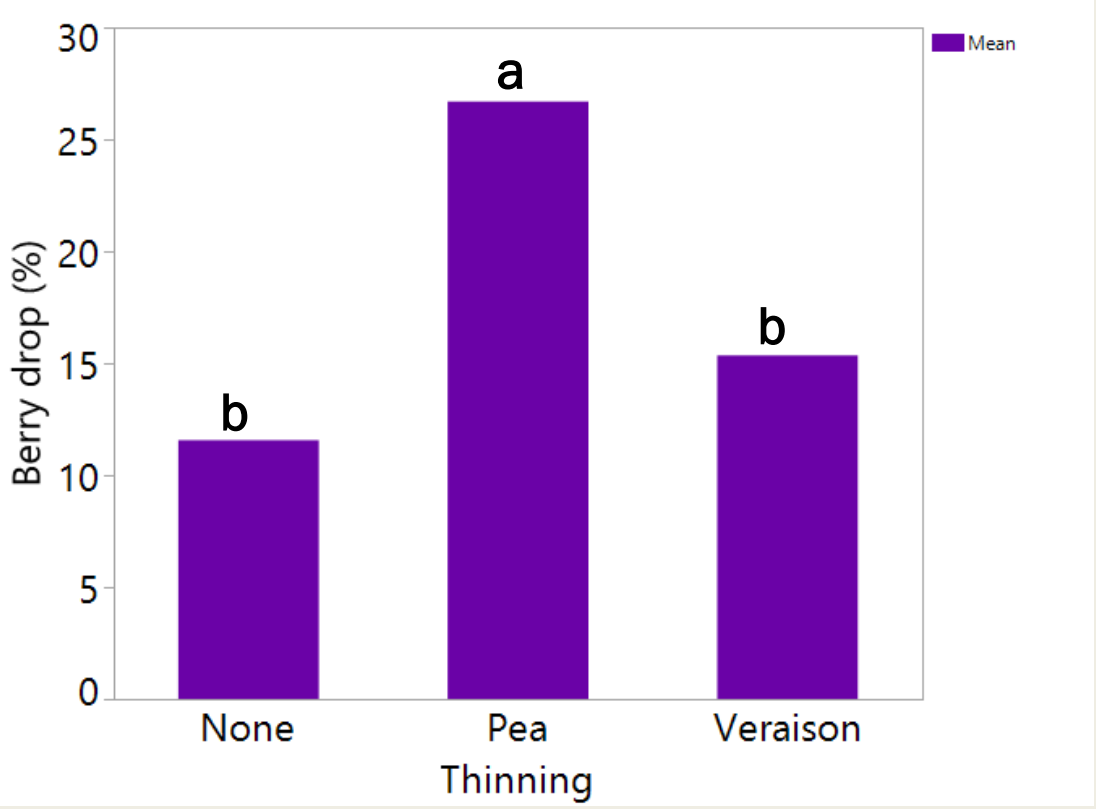


Fig. 10. Berry drop (%) of high tunnel ‘Jupiter’ grapes with different cluster thinning treatments (none and pea-sized berries) stored at 2 °C for 0, 7, 14, and 21 d, Fayetteville, AR (2019).



Main Effects for Decay in Cabot

Fig. 11. Decay (%) of high tunnel ‘Jupiter’ grapes stored at 2 °C for 0, 7, 14, and 21 d, Cabot, AR (2018).

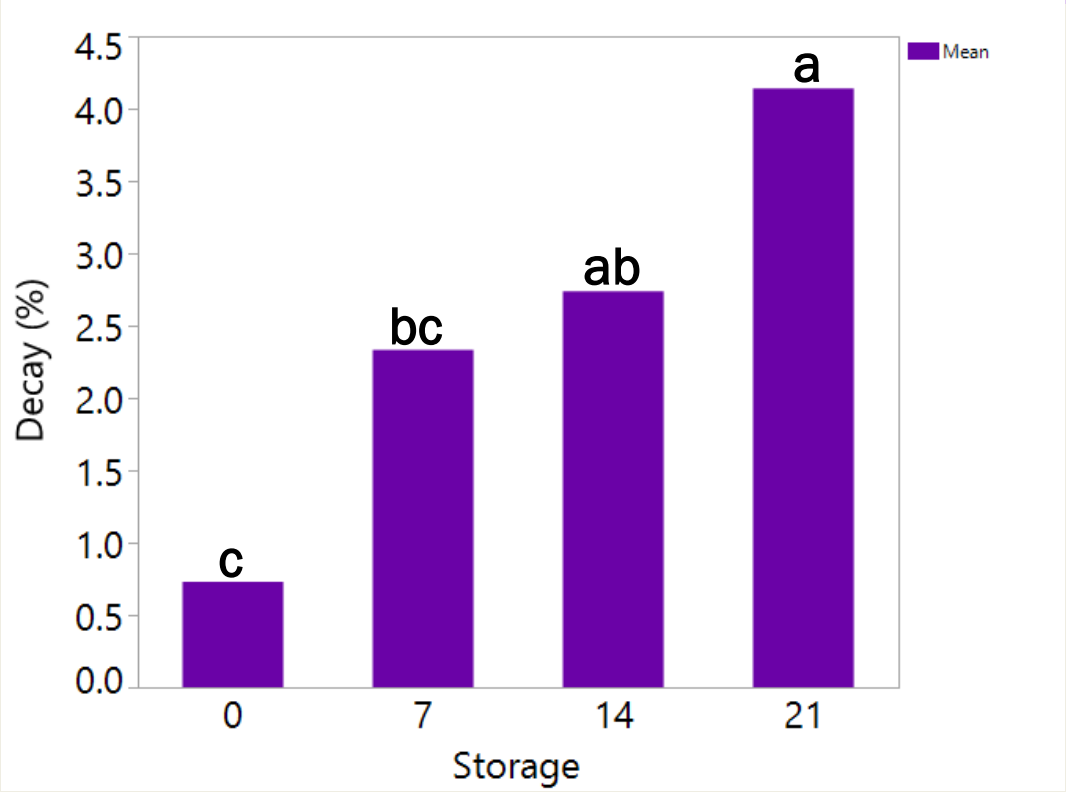
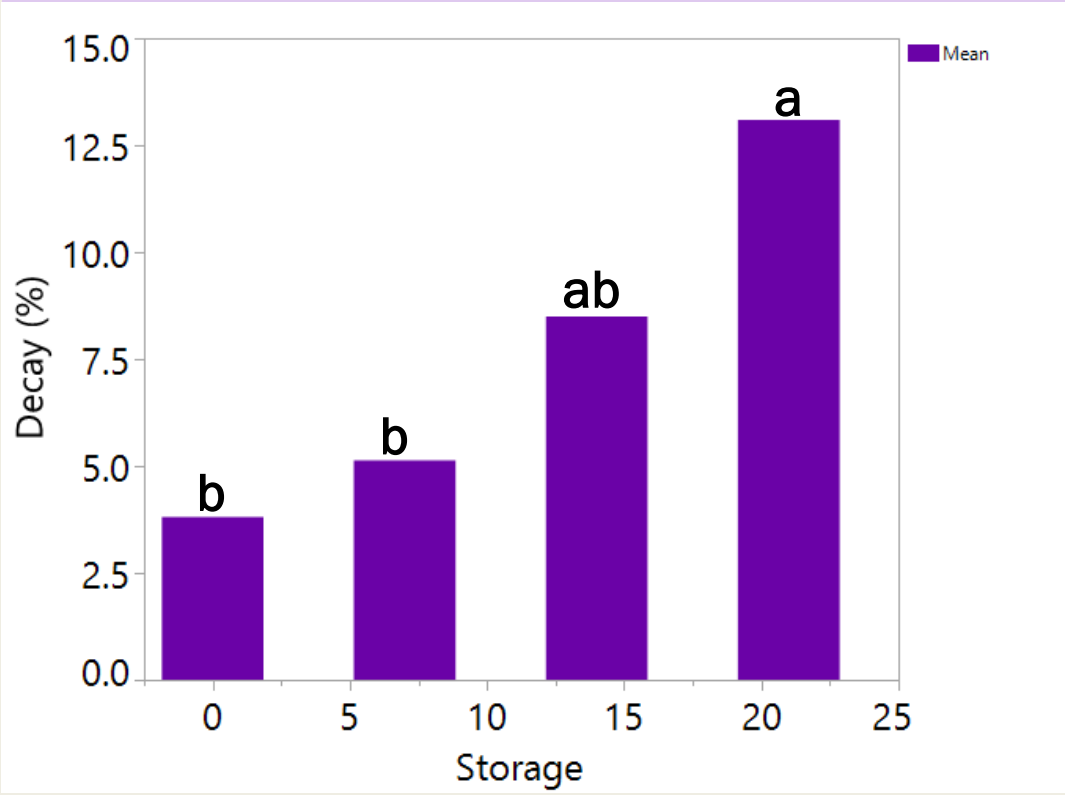
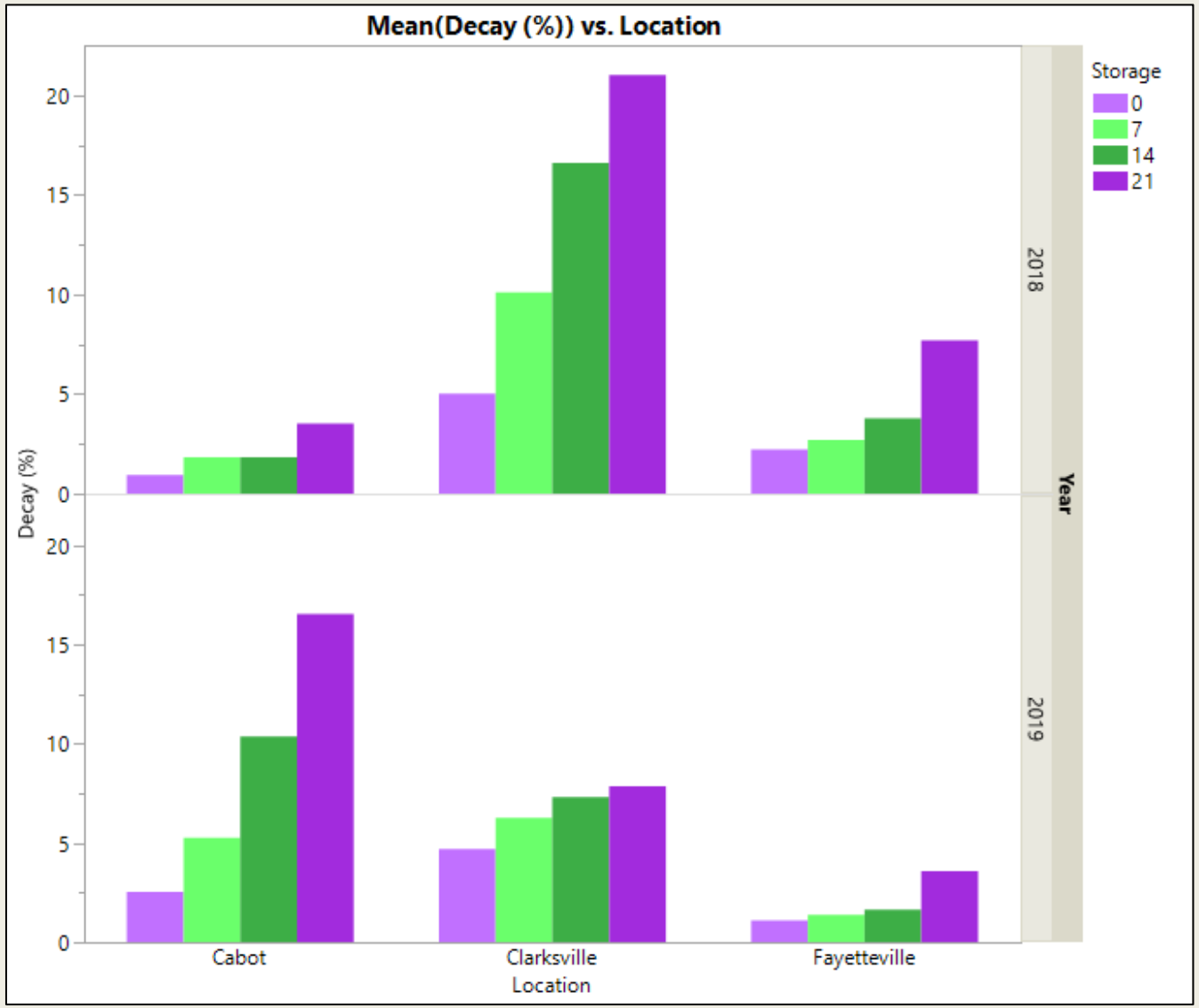


Fig. 12. Decay (%) of high tunnel ‘Jupiter’ grapes stored at 2 °C for 0, 7, 14, and 21 d, Cabot, AR (2019).

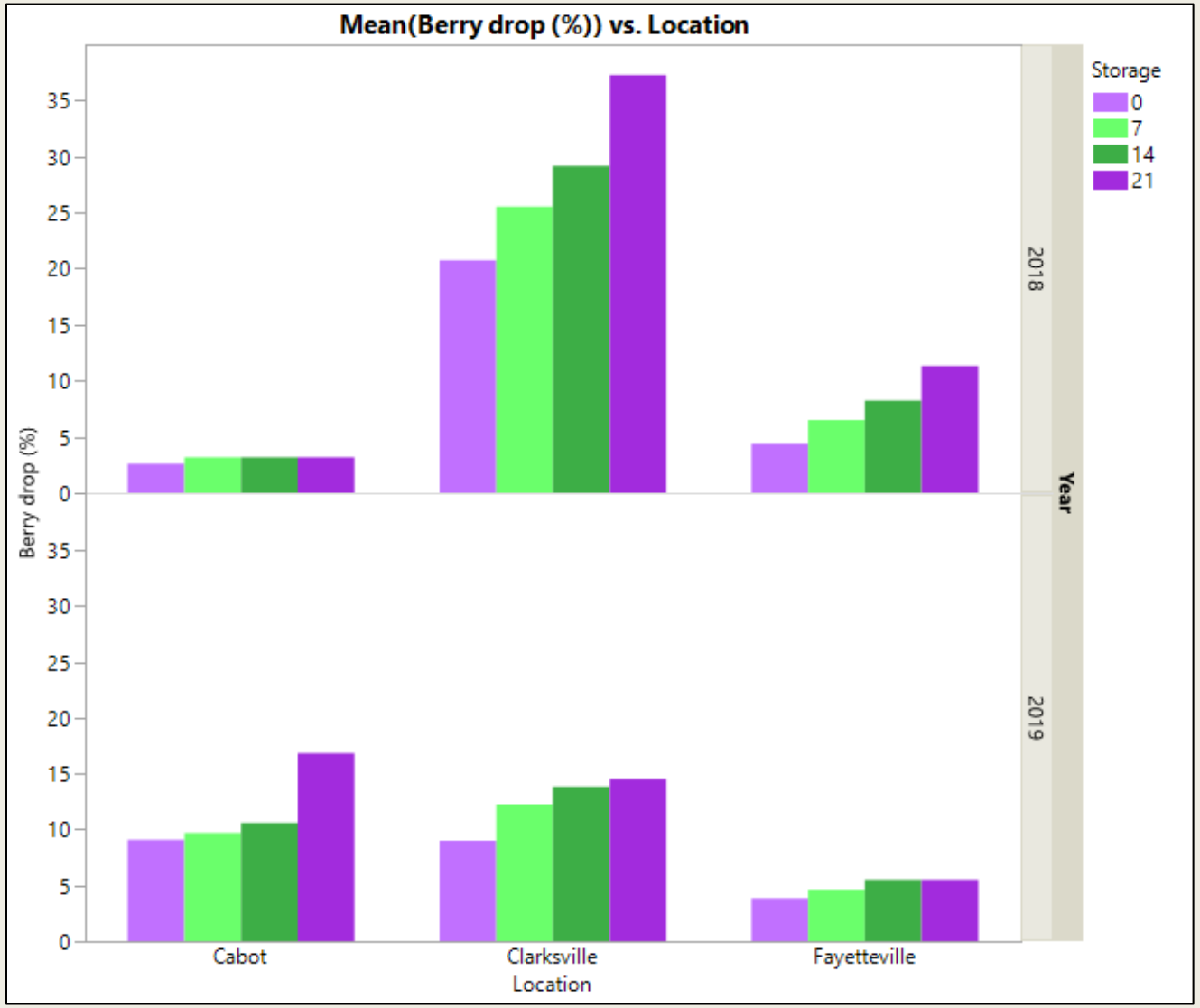


Jupiter Decay - All Locations Comparison



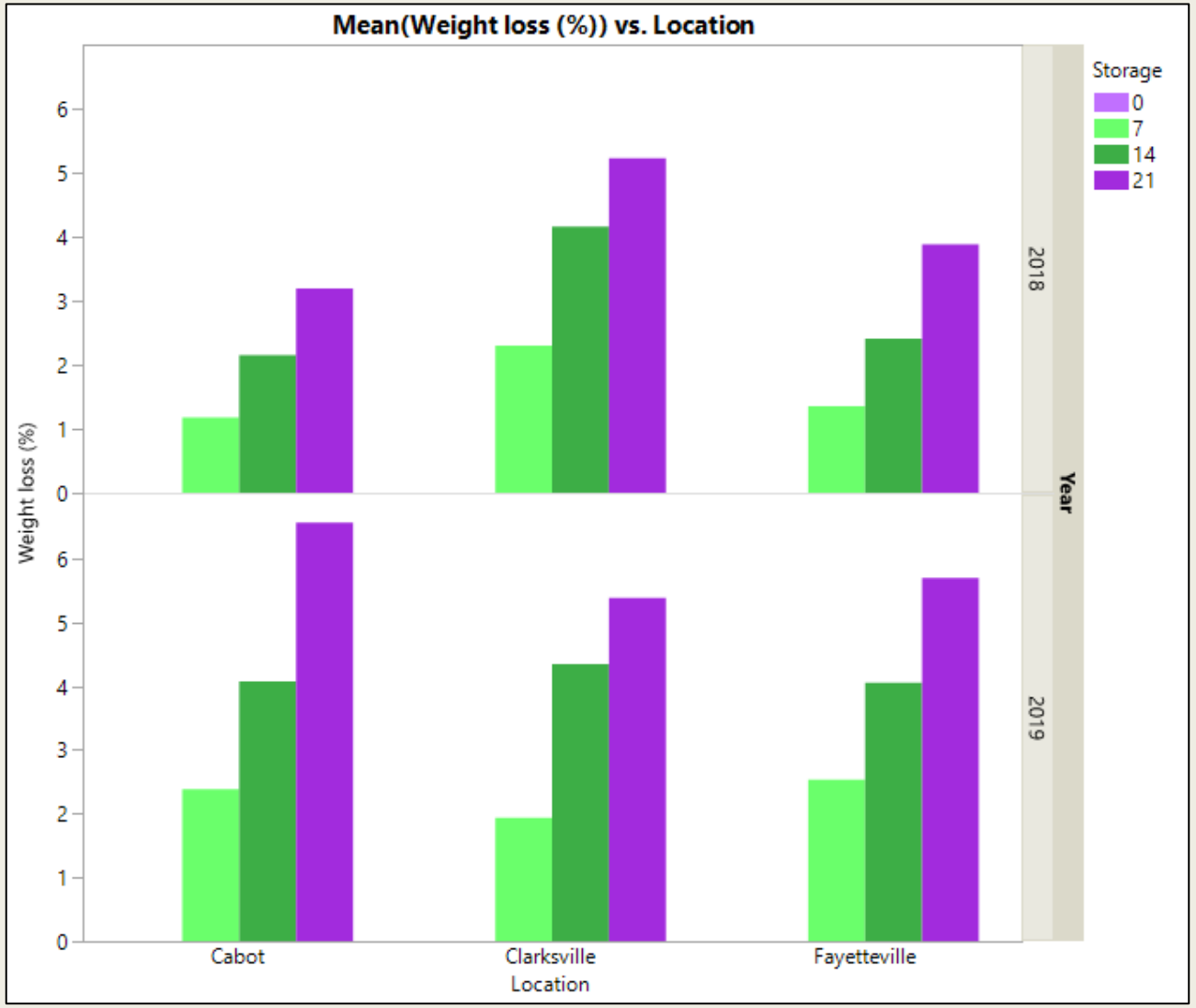
Not Statistically Analyzed		
2018		
Location	Production	Decay (%)
Cabot	High Tunnel	2.03
Clarksville	Field	13.19
Fayetteville	High Tunnel	4.10
2019		
Location	Production	Decay (%)
Cabot	High Tunnel	8.67
Clarksville	Field	6.54
Fayetteville	High Tunnel	1.93

Jupiter Berry Drop - All Locations Comparison



Not Statistically Analyzed		
2018		
Location	**Production**	**Berry Drop (%)**
Cabot	High Tunnel	3.04
Clarksville	Field	28.18
Fayetteville	High Tunnel	7.61
2019		
Location	**Production**	**Berry Drop (%)**
Cabot	High Tunnel	11.56
Clarksville	Field	12.43
Fayetteville	High Tunnel	4.88

Jupiter Weight Loss - All Locations Comparison



Not Statistically Analyzed		
2018		
Location	Production	Weight Loss (%)
Cabot	High Tunnel	1.63
Clarksville	Field	2.92
Fayetteville	High Tunnel	1.91
2019		
Location	Production	Weight Loss (%)
Cabot	High Tunnel	3.25
Clarksville	Field	2.91
Fayetteville	High Tunnel	3.07

Conclusions - Composition

- In Fayetteville, soluble solids were greater for non-thinned vines in 2019
- In Cabot, soluble solids were highest for veraison-thinned vines and lowest for non-thinned vines in 2018
- In Cabot, titratable acidity was greatest for non-thinned vines in 2018

Conclusions - Marketability

- In Fayetteville, marketability traits varied in 2019
  - Berry drop was greatest for thinned vines
  - Weight loss was highest for non-thinned vines
- In Cabot, berry drop was greatest for pea-size thinned vines in both years
- Mean weight loss in Cabot varied by year
  - In 2018, weight loss after 21 days was highest for non-thinned vines
  - In 2019, weight loss after 21 days was highest for veraison-thinned vines

Conclusions - Overall

❖**All Locations Marketability**

- Decay (%) was usually lower for high tunnel locations compared to Clarksville
- Berry drop (%) was higher on average in Clarksville in both years
- Weight Loss (%) was low in all locations. Averages varied by year.

Acknowledgements

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

- University of Arkansas Faculty, Staff, and Students
  - Committee Memebers:
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    - Dr. Renee Threlfall
    - Dr. Amanda McWhirt
    - Dr. Jacquelyn Lee
  - Others
    - Karlee Pruitt
    - Jose Hernandez
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SOUTHERN SARE Sustainable Agriculture Research & Education

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