



# Effects of High Tunnel Production on Postharvest Marketability of Arkansas Table Grapes

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MOLLY FELTS, M.S.

RENEE THRELFALL, PH.D.

FOOD SCIENCE DEPARTMENT, UNIVERSITY OF ARKANSAS

M. ELENA GARCIA, PH.D.

HORTICULTURE DEPARTMENT, UNIVERSITY OF ARKANSAS

# World and U.S. Table Grape Production

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- Twenty-four million metric tons of table grapes are produced worldwide.
- The United States was the 5<sup>th</sup> largest producer of fresh-market grapes.
  - 907,000 metric tons
  - \$1.56 billion in value
- California is the largest U.S. producer.
  - 99% of fresh-market grapes grown.



# Table Grape Production in Arkansas

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- One of the oldest grape-producing states in the southern United States
- In 2015, total grape production in Arkansas was 1,400 metric tons.
  - Survey indicated 22% of Arkansas grape production was table grapes
- In 2002, Arkansas was ranked 12<sup>th</sup> in grape production with 9% of the crops used for fresh-market consumption.



# Challenges Growing Table Grapes in Arkansas

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- Table grapes grown in the southern region of the United States are an extremely high input crop.
  - Pest pressures
  - Humid climate
- The economic and environmental sustainability of grape production could be improved in the southern region by protected agriculture systems.
  - High tunnels (passively heated structures that physically protect crops)

# Challenges Growing Table Grapes in Arkansas

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# High Tunnel Fruit Production

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- High tunnels can extend the growing season and protect crops from weather and pests.
  - Increase yields
  - Increase marketability
  - double profits



# High Tunnel Table Grape Vines

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- Table grapes grown at the the University of Arkansas Agricultural Research and Extension Center, Fayetteville AR.
- Grapes are grown on three trellis systems (Geneva double curtain and two modified, high wire, bilateral cordons).
- Vines were planted in 2014.



# Table Grapes Evaluated

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- Four cultivars (Faith, Gratitude, Jupiter, and Mars) were evaluated.
- 4 kg of each cultivar were harvested.
- Fruit was evaluated for physicochemical and marketability attributes at harvest and during storage (0, 7, 14, and 21 days) at 2 °C.







Gratitude



Jupiter





Faith



Mars

# Analysis

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- **Size**

- Cluster weight (g)
- Berry weight (g)

- **Composition**

- Soluble solids (%)
- pH
- Titratable acidity (% tartaric acid)

- **Texture**

- Firmness (N)
- Skin elasticity (mm)

- **Marketability**

- Weight loss
- Decay (visible mold or rot)
- Berry drop (shatter)





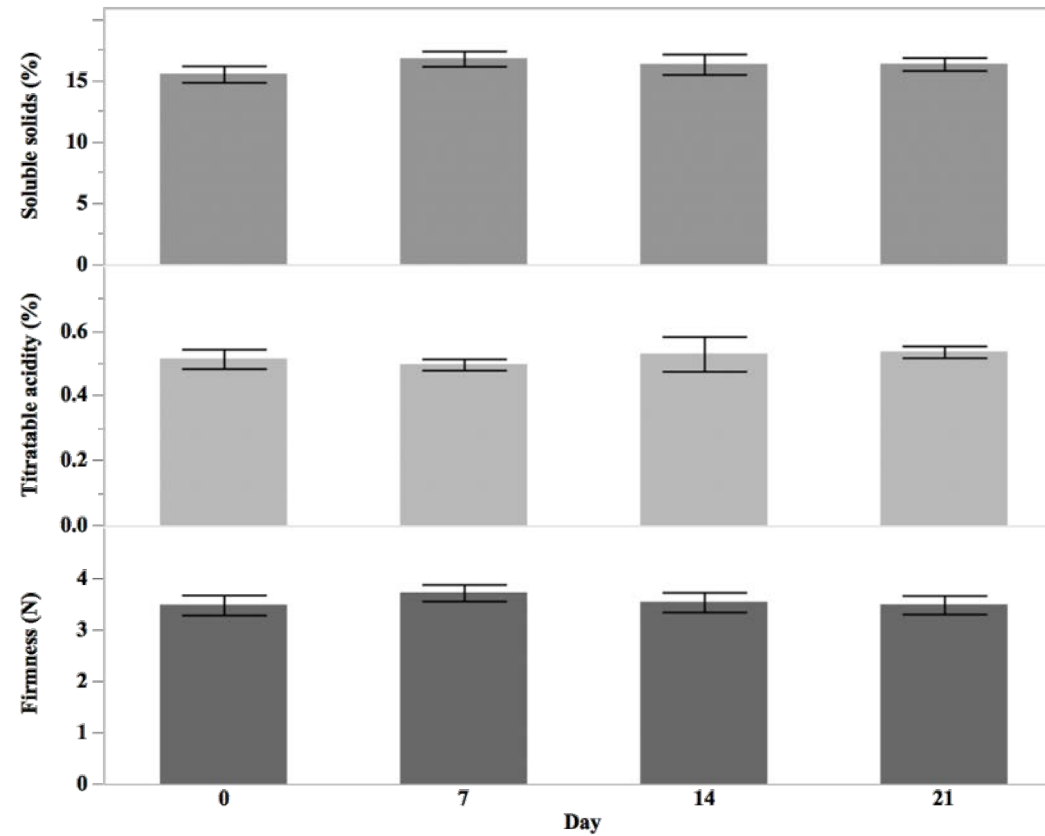


# Results at Harvest

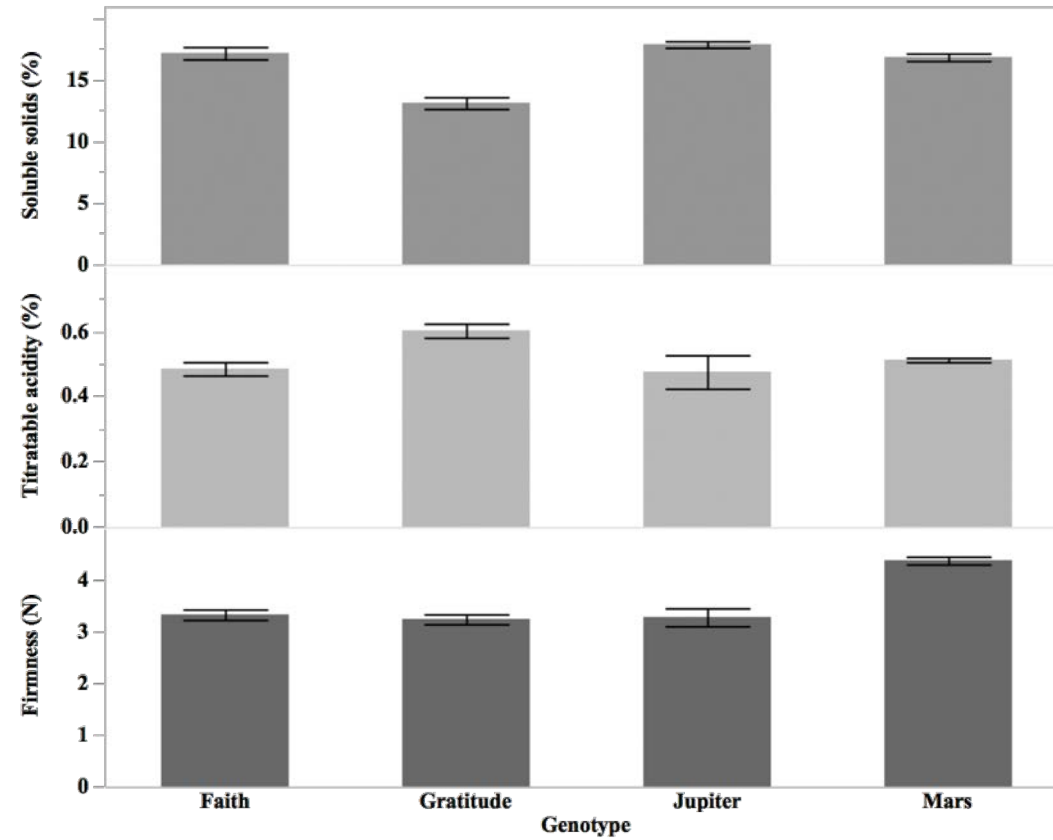
<b>Genotype</b>	<b>Cluster weight (g)</b>	<b>Berry weight (g)</b>	<b>Soluble solids (%)</b>	<b>pH</b>	<b>Titratable acidity (%)</b>	<b>Firmness (N)</b>
Faith	246.95	3.21	15.90	3.44	0.47	3.13
Gratitude	359.28	2.38	12.00	3.13	0.65	3.46
Jupiter	256.83	4.56	17.30	3.71	0.42	3.03
Mars	201.64	3.65	16.90	3.33	0.52	4.35



# Composition and Firmness during Storage

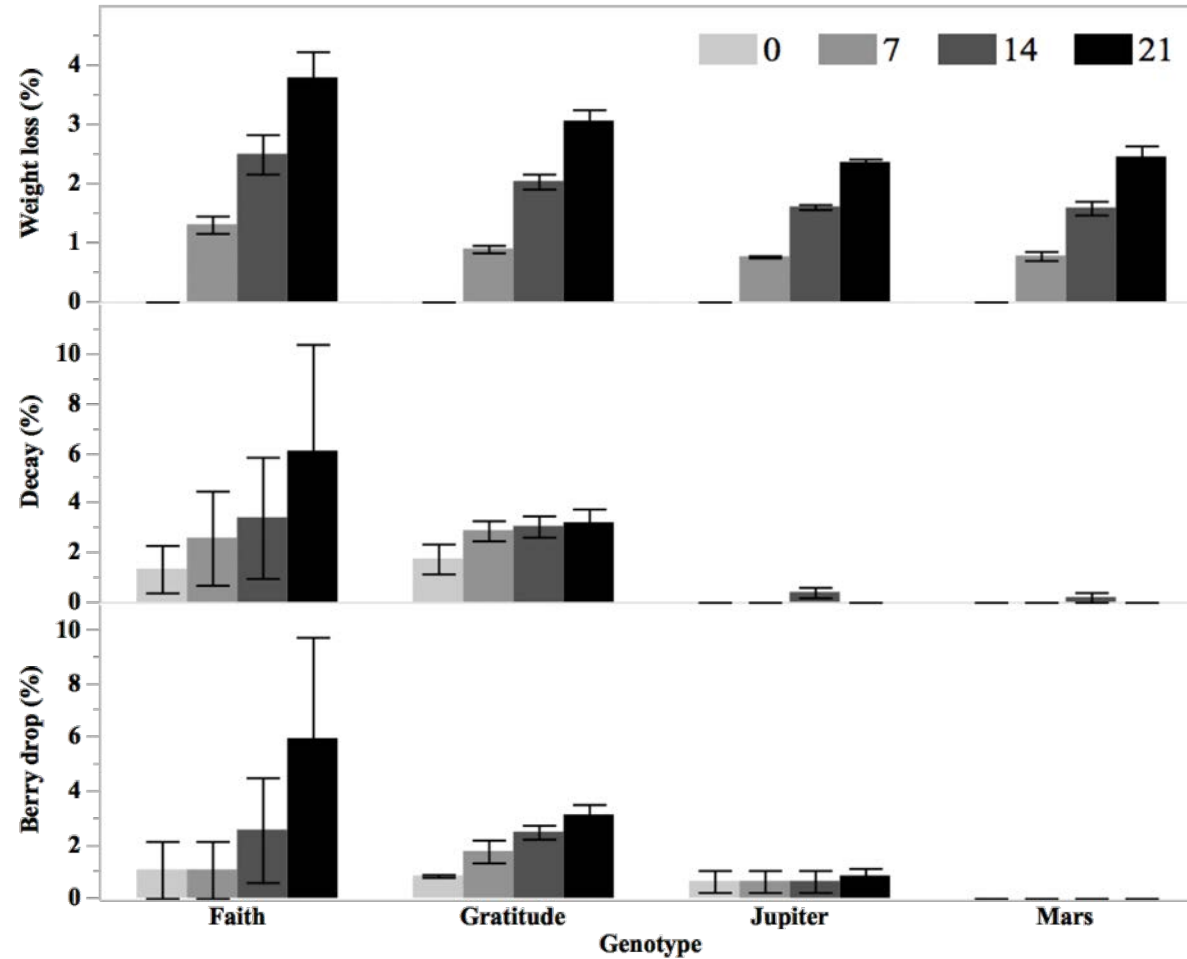


# Composition and Firmness during Storage





# Marketability during Storage



# Conclusions

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- At harvest, the fruit had good size, composition, and texture.
- During storage, the high tunnel yielded marketable fruit with low
  - Weight loss
  - Decay
  - Berry drop
- The firmness of the fruit was not affected by storage.
- The composition of the fruit was minimally impacted at 21 d storage.
  - No change in soluble solids or titratable acidity
  - Decrease in pH



# Conclusions

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- Arkansas high tunnel table grape production has the potential to improve,
  - Table grape quality
  - Shelf-life/marketability
- This study demonstrated the potential for a table grape industry in Arkansas.



# Acknowledgements

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# Questions?

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