

Use of Ethephon and 1-MCP in the Harvest and Storage of Manchurian Crabapples

H. Edwin Winzeler and James R. Schupp
Penn State University

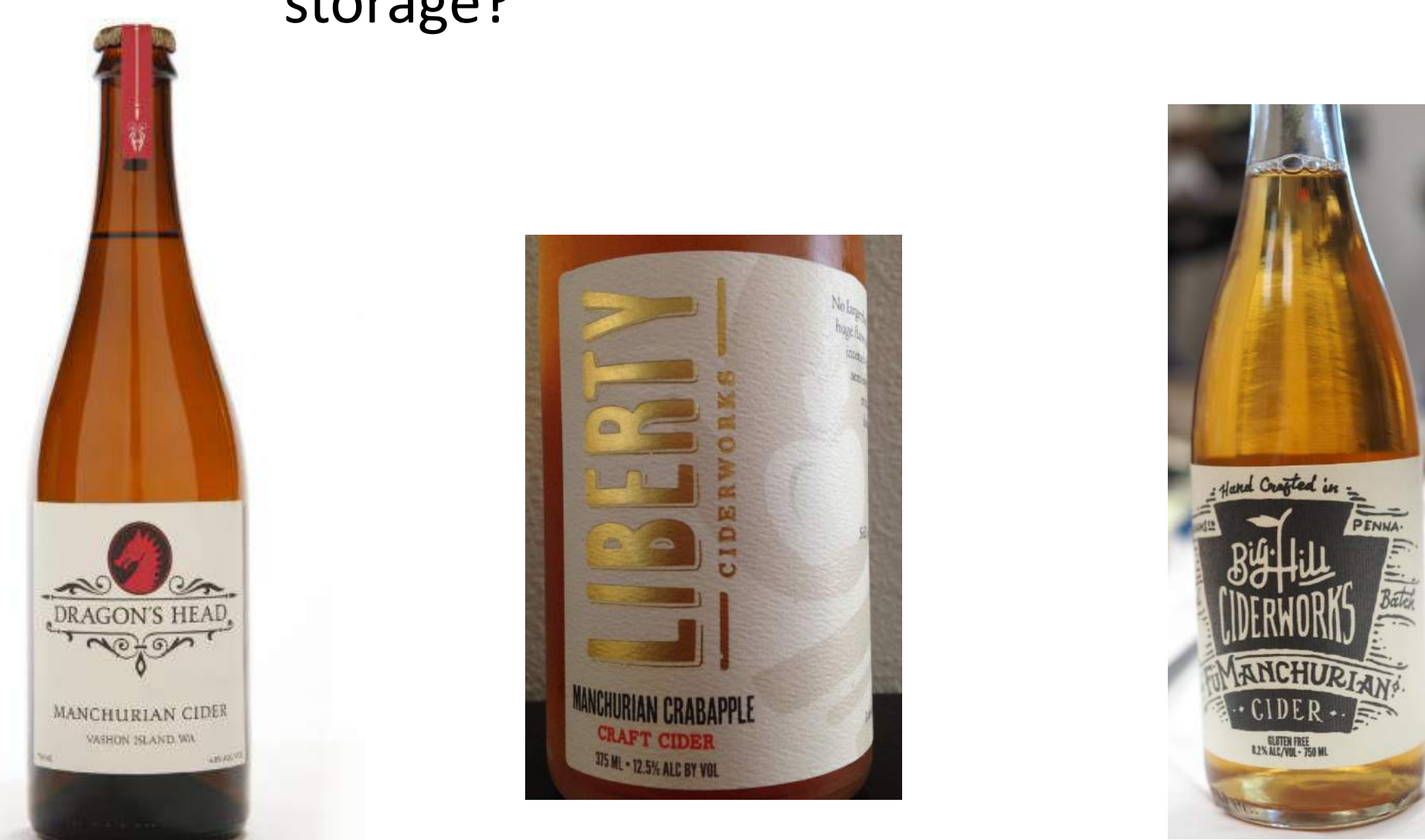


Manchurian crabapple

- Widely planted pollenizer
- In estimated 60 to 70% of orchards in Washington state
- Planted at a rate of 5 to 10% of the total trees in these orchards
 - <http://www.goodfruit.com/research-on-rot-is-under-way/>
- Back of envelope (WA alone):
 - 148,000 acres X .6 (.7) X 0.05 (.1) = 4,400 to 10,360 acres
 - Assume 500 bu/acre?
 - Assume 2.8 gallons of juice per bushel?
 - ~6 to 15 million gallons of Manchurian juice available?



- Small (~ 1" diameter)
- Tannin content about 3 times that of cider variety 'Kingston Black'
 - (~6000 mg/L polyphenol GAE)
- Brix 20+
- Acidity 10-12 g/L
- A bittersharp with more tannin per unit acidity than Kingston Black
- Aroma – strong dark cherry and bitter almond
- Can it be managed effectively? Strategies and issues:
 - Harvest by hand is costly
 - Diseases and disorders in cold storage
 - Ethephon (Ethrel®) to loosen stems and shake/catch much like a tart cherry capture system?
 - 1-MCP to help maintain quality in cold storage?



Ethephon (Ethrel®)

The most widely used plant growth regulator
Metabolized by the plant and converted to ethylene internally
Increases ripeness
Used on many plants and fruits
Trade name Ethrel® Labeled for loosening the abscission layer between apples and limbs (stem loosener)

1-Methylcyclopropene (1-MCP, SmartFreshSM)

A competitive inhibitor of ethylene
Binds to ethylene receptor in apples, making fruit largely unresponsive to ambient ethylene
Widely used in commercial apple production for increased storage life

Storage Disorders in Manchurian

Sphaeropsis rot (*Sphaeropsis pyriputrescens*)
Speck rot (*Phacidiopycnis washingtonensis*)

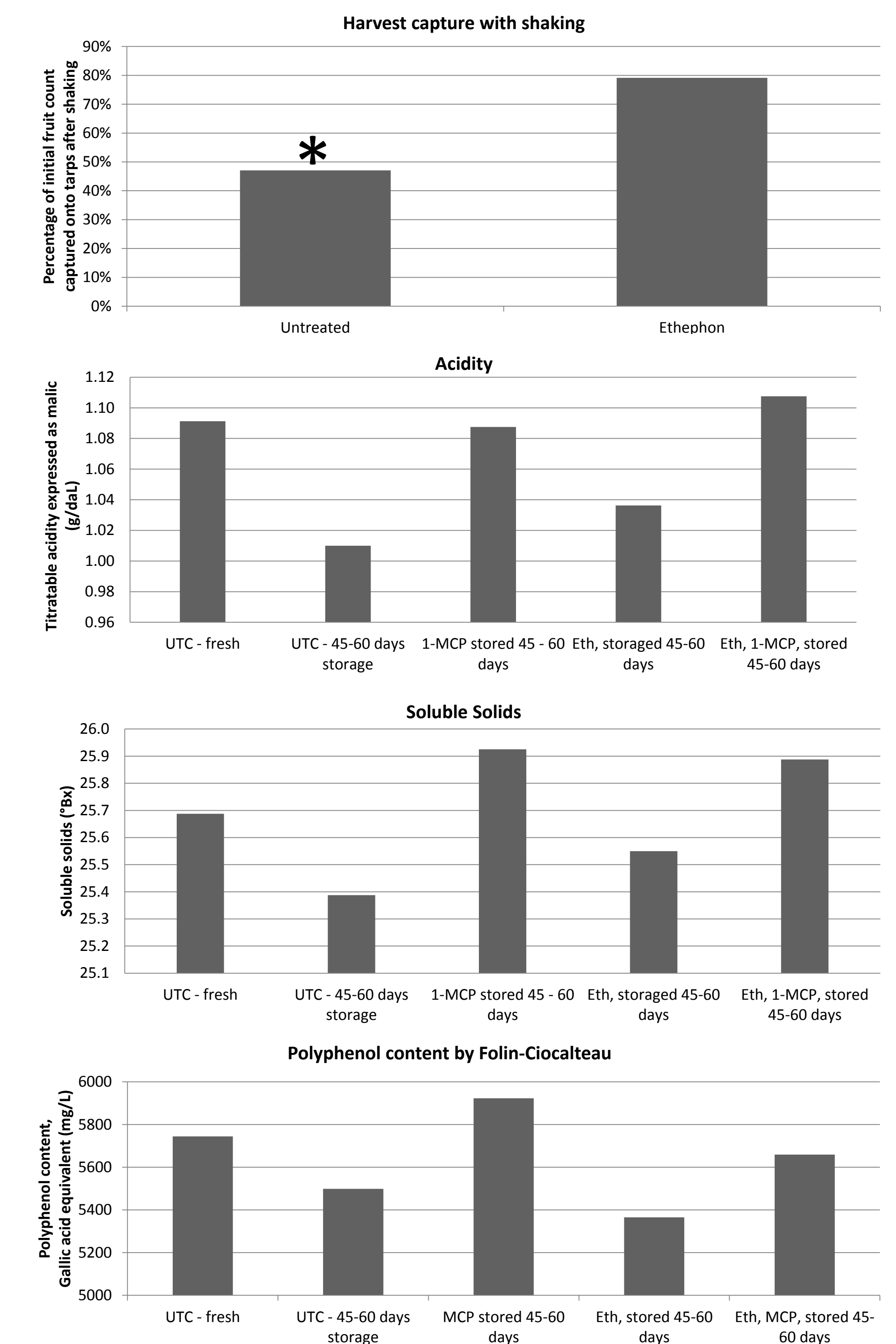


Can treatment with 1-MCP facilitate longer storage of Manchurian Crabapples to maintain juice quality?

- Treatments
- 1 – Untreated control processed immediately
 - 2 – Untreated control processed after 45 – 60 days of storage
 - 3 – 1-MCP treated, processed after 45 – 60 days of storage
 - 4 – Ethephon treated, processed after 45 – 60 days of storage
 - 5 – Ethephon and 1-MCP treated, processed after 45 – 60 days of storage

Does ethephon (2.75 ounces Ethrel® per 5 gallons of water) use result in better abscission for Manchurians?
Does ethephon cause faster fruit collapse in cold storage of Manchurians?
Does 1-MCP preserve fruit quality in cold storage with/without initial ethephon application?
What are the juice quality returns from these treatments?

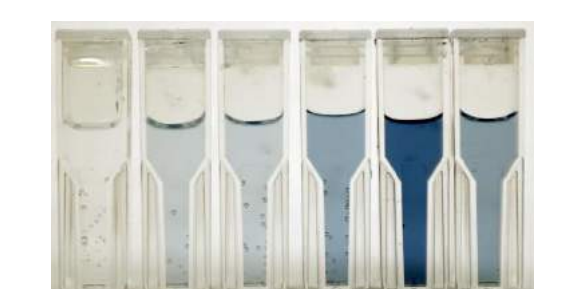
Results



Conclusions

All treatments produced quality cider juice

- High brix
- High polyphenol content
- High acidity



Treatments with ethephon resulted in better fruit capture during harvest by shaking
Treatments with 1-MCP resulted in maintenance of acidity, polyphenol content, and soluble solids after 45 – 60 days of storage
No treatments led to significant collapse of fruit quality
Management strategies for Manchurian Crabapple show promise
Manchurian crabapples remain a largely untapped resource for high-quality cider

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