

Passive Prediction Model for Determining Storage Potential of Honeycrisp

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Bitter pit risk prediction

Despite more than 50 years of mineral based prediction models for bitter pit, commercial application *for storage decisions* is rare

Costly

Organizationally difficult

Prediction models based on passive, ethylene and magnesium treatments have been developed and tested in several labs

Objective

To develop a low cost easily applicable prediction model for bitter pit in Honeycrisp apples for New York

Investigated magnesium, ethylene and passive methods

The magnesium method showed toxicity on the fruit that was difficult to distinguish from bitter pit, so we discarded this method.

Ethylene method requires dipping of fruit in ethephon (not a labelled use).

Passive is the easiest and low cost method for growers and storage operators.

Passive always superior than mineral methods

Sampling time	Factors	C+ 38°F
		R ²
3WBH	Passive	0.91
	Ca	-0.67
	(K+Mg)/Ca	0.77

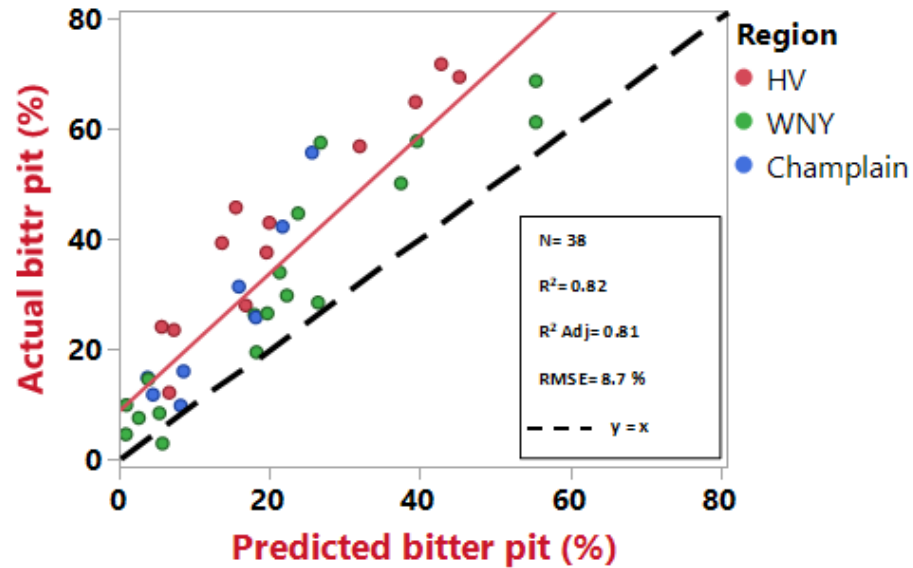
So what is the passive method?

Fruit harvested three weeks before anticipated commercial harvest.

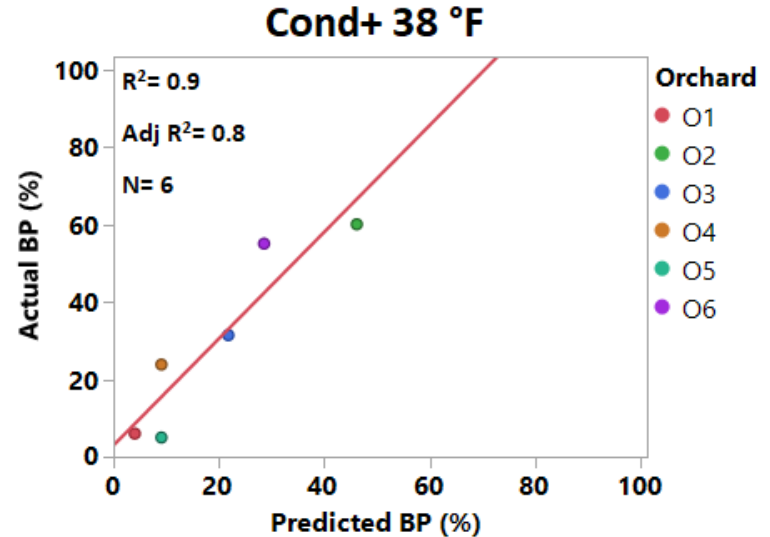
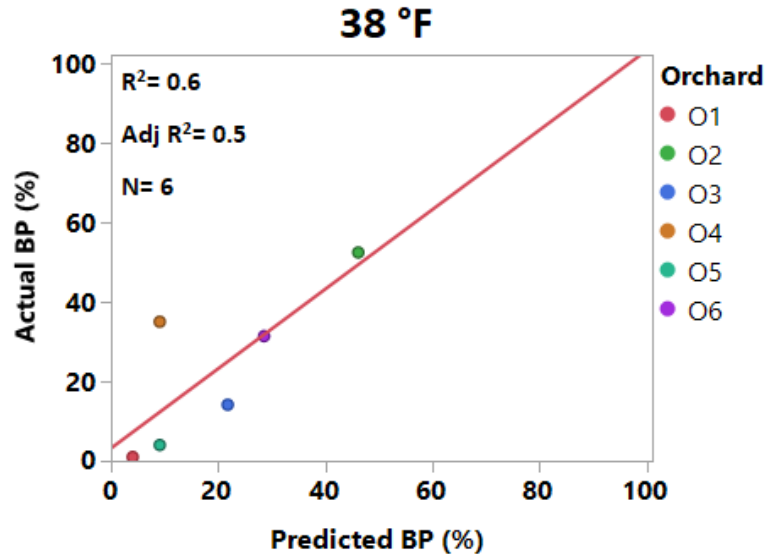
Fruit kept at 68°F for 3 weeks.

Bitter pit is measured (ext and int).

Actual and predicted bitter pit for fruit from all regions (2018)



Hot off the press – WNY 2019



NYFVI Project – Dan Donahue, Craig Kahlke, Mike Basedow

Refinement and implementation of newly-developed technologies to significantly reduce producer losses to bitter pit in the ‘Honeycrisp’ C.V. apple.

- 22 blocks Niagara/Orleans
- 20 blocks Wayne
- 20 blocks HV
- 20 blocks CV

What should you do this harvest season?

- **Three weeks before anticipated first harvest date, harvest 100 fruit of average size from trees throughout each block.**
- **Keep fruit at approx. 68°F for three weeks.**
- **Assess bitter pit incidence**

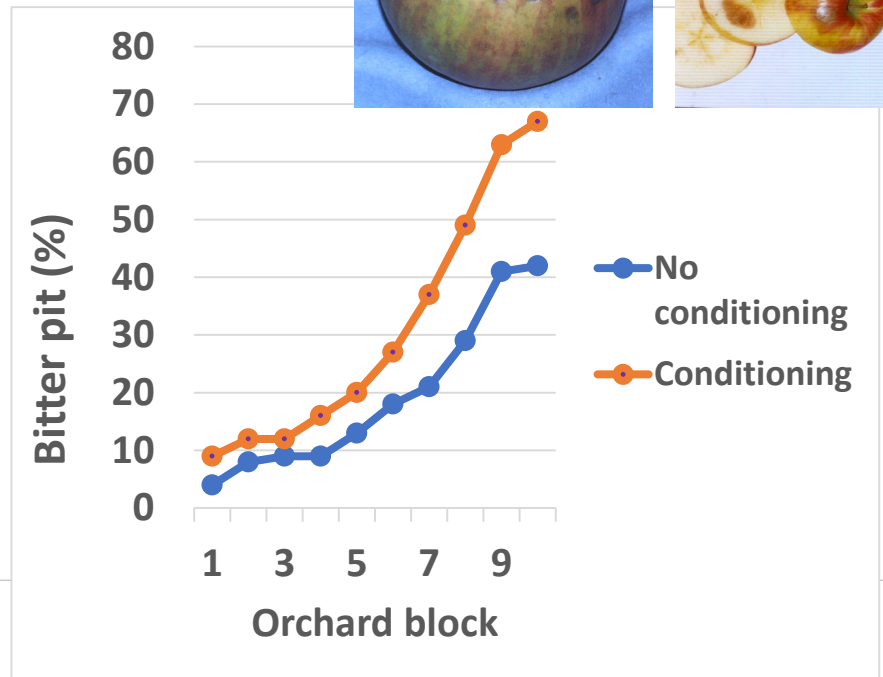
What do you do with the information?

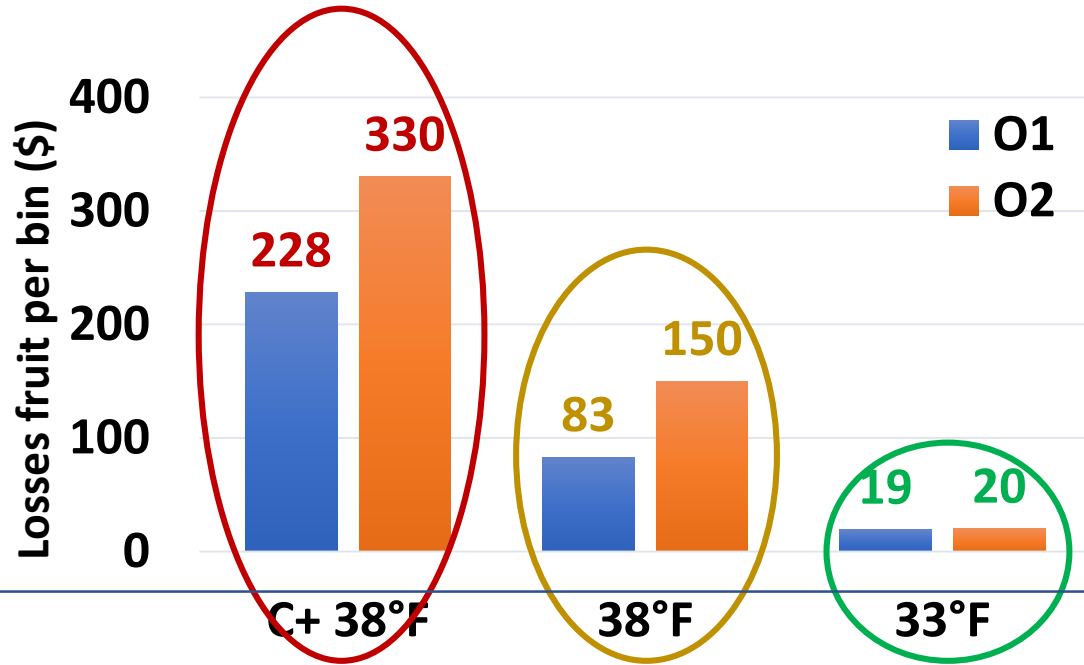
Things to consider.

- Bitter pit
- Soft scald and soggy breakdown

Bitter pit is exacerbated by conditioning

- Conditioning reduces/eliminates soft scald and soggy breakdown.
- Conditioning exacerbates bitter pit.
- Soft scald/soggy breakdown does not always occur
- Can we avoid conditioning?

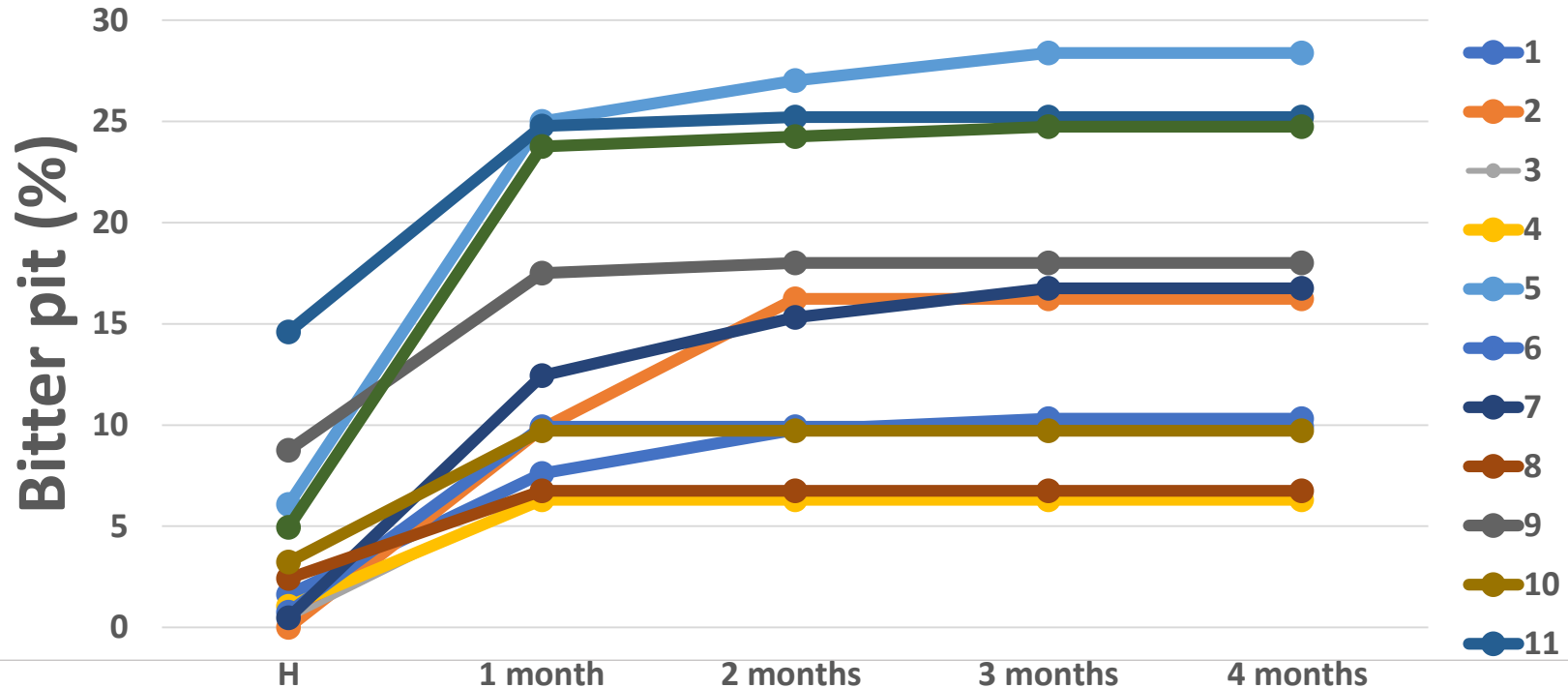




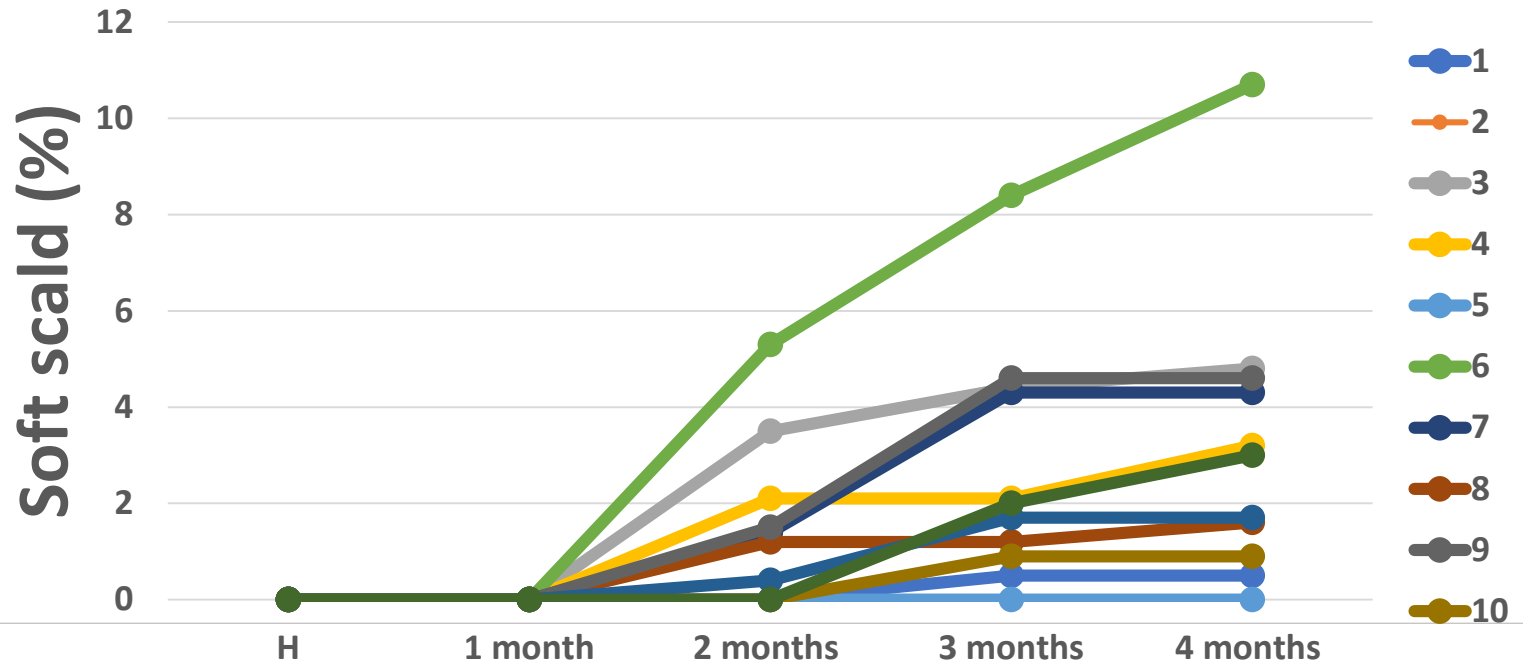
Bottom line – how do we manage fruit with high bitter pit incidence in order to reduce these losses?

Dynamics of bitter pit and soft scald should be considered

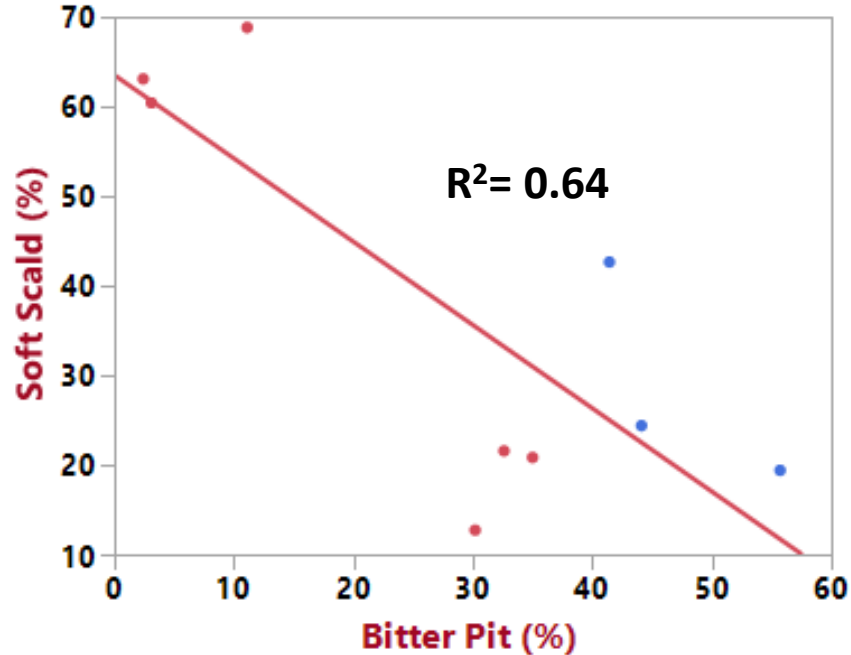
Bitter pit (WNY):



Soft scald (WNY):



An additional observation



The correlation between soft scald at 33°F and bitter pit at 38°F after 1 week of conditioning at 50°F for 'Honeycrisp' apples from 3 orchard blocks in WNY after 4 months of storage in 2015 harvest season .

Possible strategies (1)

For fruit with high bitter pit potential (> 40%)

Do Not Condition but store at 38°F for 1 month.

- **Outcome** = much reduced bitter pit after storage. Stabilize bitter pit for one month in storage to minimize pit in the marketplace.

(Do not market high bitter pit risk immediately).

What is the risk? – rare risk of soft scald and soggy breakdown without conditioning, but remember that actual losses with bitter pit are usually much greater than occasional losses with soft scald/soggy breakdown.

Possible strategies (2) – *but not yet recommended*

For fruit with high bitter pit potential,

Do Not Condition but store at 33°F for less than 1 month.

- **Outcome** = much reduced bitter pit after storage.

What is the risk? – greater risk of soft scald and soggy breakdown at 33°F, but storage time factor critical.

Summary

Passive prediction method is one that you as growers can start using now.

Results will allow you to save money by avoiding conditioning

Future research is exploring use of even lower storage temperatures for high bitter pit risk fruit (in low soft scald susceptible regions).

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Thank you