

STEM-ON WORK FOR BRINE CHERRY MARKET

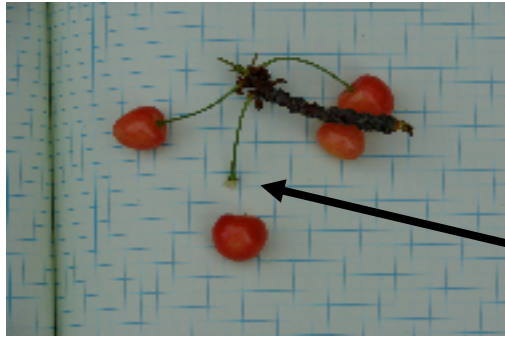
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Rationale. National and international markets are demanding brine fruit with stems. At this time, 99% of fruit in Michigan is mechanically harvested without stems by using ethephon causing processors to source stem-on cherries from other regions to supply the market. Additionally, there has been a general oversupply of brine fruit *without* stems and stems can increase the value of brine fruit.

How is the fruit removed?

Upper abscission



Lower abscission zone

The optimal window for mechanically harvesting stem-on fruit can be predicted by measuring different factors in the orchard. Fruit size/weight, brix, and/or fruit removal force (FRF) measurements were collected daily on 20-year old Emperor Francis (EF) and Gold sweet cherry trees. Growing degree hours (GDH) were also recorded. Measurements were made just prior to shaking an individual tree/day with a standard double incline shaker. Cherries were collected from the shaker and the percentage of stems retained was calculated. At this time, preliminary data suggest that as FRF decreases, stem retention also decreases (Figures 1 and 2). Conversely, as brix levels increase, the percent stem retention decreases (Figures 3 and 4). EF appear to retain their stems for more days (12+) than Golds. Cool seasonal temperatures in 2009 may have influenced results.

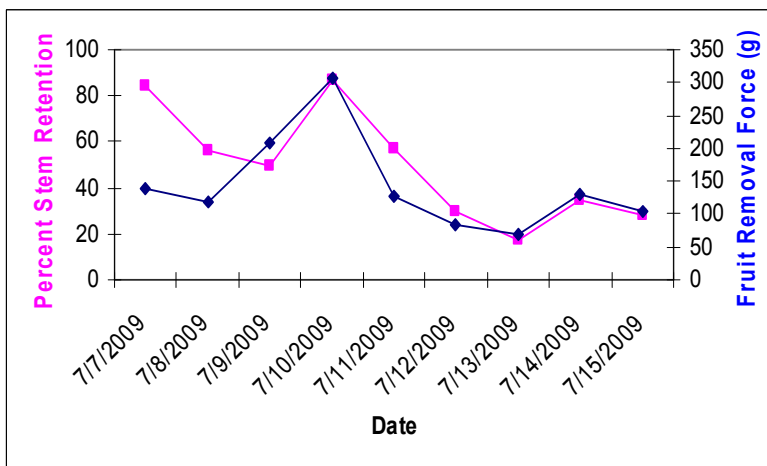


Figure 1. Stem retention and FRF in Gold

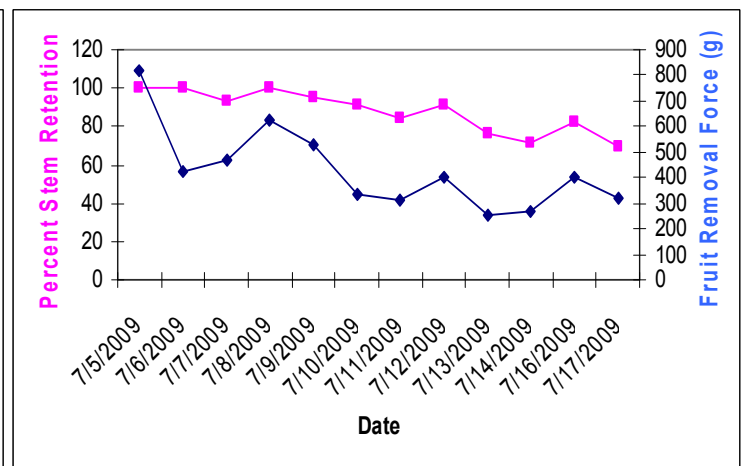


Figure 2. Stem retention and FRF in E. Francis

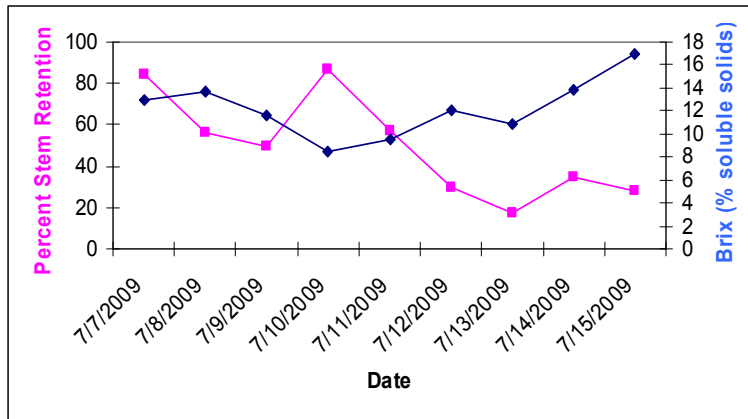


Figure 3. Stem retention and brix in Golds.

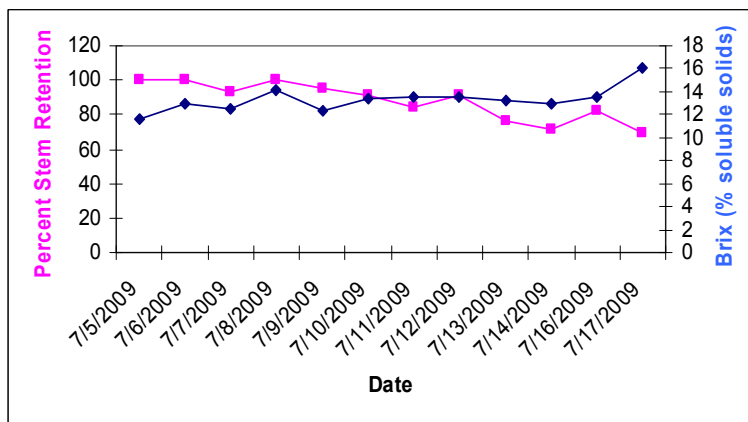
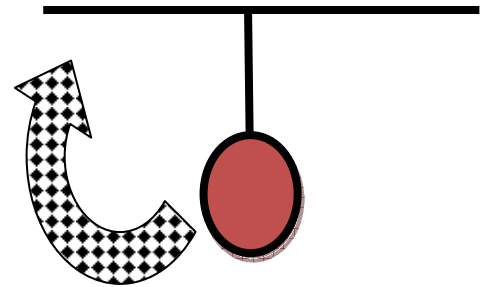


Figure 4. Stem retention and brix in E. Francis.

Current hypothesis for stem-on fruit removal.

1. Mass of fruit must be large enough to swing on the stem to ‘tear’ the stem from the shoot.
2. The lower abscission zone FRF must be high enough so that the fruit does not abscise from the stem.



Crop loads with single fruit/pairs will have higher stem retention during mechanical harvest than crop loads with dense fruit clusters.

In order to determine the affect of crop load on stem retention, six 8-year old EF trees were hand-thinned to one fruit/spur on 3 June, 2009; crop load was reduced by 2/3 on those trees. No fruit were removed in six untreated trees. We observed no differences in stem retention between thinned and untreated trees (Table 1). Fruit removal force was also not significantly different between treatments: control FRF was 261.3±11.07 and thinned FRF was 250.5±11.5.

	% Stem Retention
Control	90.8 ± 2
Thinned	94 ± 2

Table 1. Stem retention in thinned and non-thinned trees.

Pre-harvest applications of ethephon can preferentially promote abscission.

Three EF trees were treated with 2 1/2 pints of ethephon on 3 July, 2009. Three trees were left untreated, and all trees were shaken on 10, 11, and 12 July. We measured the percent stem retention, FRF, size, weight, and brix. Trees treated with ethephon had a lower stem retention and fruit removal force than untreated trees (Table 2). Brix levels were similar for both treatments.

	% Stem Retention	FRF	Brix
Ethephon-treated	78.70%	244.7	13.1
Control	88.70%	461.9	13.5

Table 2. Stem retention, FRF and brix with and without ethephon.

Current measurements for 2010.

Location	Variety	Weight (g)	Diameter (mm)	Brix	Pull Force
Bahle	E.F.	34.5	17.3	11.7	1011
Northport	E.F.	21.2	14.9	9.3	>1000
Shugart	E.F.	45.4	19.4	11.6	1016
Bahle	Gold	23.1	15.6	9.5	>1000
Northport	Gold	15.5	13.2	6.3	>1000

Table 3. Measurements for Emperor Francis and Gold at three locations on June 14, 2010