A Review of Continuously Moving Harvesters for Cherry

1. USDA Peterson Berry Harvester Prototype (BTR)
2. Grant’s Cherry Harvester Prototype (BTR)
3. Oxbo Commercial Citrus Harvester (BTR)
4. Korvan Commercial Blueberry Harvester (OTR)

Ron Perry, Jim Flore, Nikki Rothwell, Amy Iezzoni, Dan Guyer, Greg Lang, Suzanne Thornsbury, Phil Schwallier
Why Seek New Harvest Systems?

• Vision of the future:
  – Harvest of younger trees ➔ earlier returns
  – Earlier returns ➔ easier to establish new orchards
  – Earlier returns ➔ easier to adopt improved varieties
  – New varieties ➔ expanded markets for products (for example, dried cherry, juice concentrate, etc.)
  – Harvest of smaller trees ➔ better fruit quality
  – Smaller trees ➔ spray reduction/containment?
  – Avoid trunk shaker damage ➔ better tree health
  – Continuous harvest ➔ higher harvest efficiency
  – Continuous harvest ➔ night harvest potential?
Harvesting tart cherries must continue to evolve....

Hand held "Homelite" branch shaker being demonstrated.

Our studies show that the usefulness of this unit is limited. The manufacturer, however, plans to make 750 of these machines available to growers in 1967.
Even fresh market sweet cherry harvest is evolving with new tree training systems matched to prototype harvesters.
USDA-Peterson Berry Harvester 05

Trunk Shaker Harvester

Oxbo Citrus Harvester 07

Grant’s BTR Harvester 06
Fruiting Wall or Hedgerow Orchard Design

Target: a narrow continuous canopy with excellent fruit exposure to light
Citrus Harvesters

Model 3220
Oxbo vs. USDA Machines:
Different Sizes, Mechanisms, Materials
KORVAN (Oxbo International) 7420
Three selections, south end Row 11 from west, CHES

7/15/08
Fruit was harvested from 45 trees at CHES, about 1-2 weeks past normal harvest maturity with no ethephon.

Most trees were ~10 year-old MSU seedling selections plus Montmorency, planted at 6 X 14 ft with no training.

MSU selection 25-14 (5 trees), Tamaris (3 trees) and Nana (2 trees) were ~6 years old, planted at a wider spacing on MXM 2 rootstock, and trained lightly since establishment.

Trees had to accommodate the 5’X8’ tunnel opening of the Korvan 7420 Blueberry harvester.
First 25 selections, CHES 7/15/08
Trial Summary

- Fruit pull force ranged from 150 to 600
- 85-95% fruit removal
- Branches above 10 ft had poor fruit removal
- A few small broken branches on untrained trees
Collecting fruit at various stages in harvester system
### Off The Tree

<table>
<thead>
<tr>
<th>Variety</th>
<th>Soft Cherries</th>
<th>Total Cherries</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Mont</td>
<td>6</td>
<td>106</td>
<td>5.7</td>
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<tr>
<td>2712 (12)</td>
<td>1</td>
<td>77</td>
<td>1.3</td>
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<tr>
<td>Tamaris</td>
<td>2</td>
<td>88</td>
<td>2.3</td>
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<tr>
<td>Nana</td>
<td>1</td>
<td>91</td>
<td>1.1</td>
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<tr>
<td>2514 (20)</td>
<td>0</td>
<td>82</td>
<td>0.0</td>
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<tr>
<td>2717 (1)</td>
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<td>81</td>
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### Conveyor

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<tr>
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<td>31</td>
<td>111</td>
<td>27.9</td>
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<tr>
<td>Tamaris</td>
<td>8</td>
<td>113</td>
<td>7.1</td>
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<tr>
<td>2514 (20)</td>
<td>23</td>
<td>237</td>
<td>9.7</td>
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<tr>
<td>2717 (1)</td>
<td>26</td>
<td>105</td>
<td>24.8</td>
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### Lugs

<table>
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<th>Variety</th>
<th>Soft Cherries</th>
<th>Total Cherries</th>
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<tbody>
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<tr>
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<tr>
<td>Tamaris</td>
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<tr>
<td>Nana</td>
<td>36</td>
<td>156</td>
<td>23.1</td>
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<tr>
<td>2514 (20)</td>
<td>12</td>
<td>100</td>
<td>12.0</td>
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<tr>
<td>2717 (1)</td>
<td>15</td>
<td>120</td>
<td>12.5</td>
</tr>
</tbody>
</table>

Harvested 7/16/08 and soft fruit test on 7/17/08 performed by N. Rothwell and E. Lizotte.
Tamaris 9/18/08 Spur Type Variety

No damage to canopy and foliage
Project GREEEN Proposal

• Dec 2008 Planning Meeting - Michigan Cherry Producers, OXBO Representatives and Michigan State University Research Team

• Montmorency on various rootstocks (NWHS) and compact tart cherry selections (NWHS, CHES) are in propagation for plots to study:
  1) Future tree canopy and orchard designs,
  2) Optimal growth and fruiting habits, and
  3) Continuous harvester prototypes and operational components
Korvan Picking Systems: Dynarotor

Horizontal shaking rotary head. More aggressive removal of fruit with adjustable stroke.
Korvan Picking Systems: Rods
Catching System

Questions?

MSU Tree Fruit Research