FIRE BLIGHT
Disease You Never Want to See in Your Orchard

Dr. Mira Bulatovic-Danilovich, Associate Professor & Horticulture Extension Specialist
West Virginia University

June 18, 2020
What is Fire Blight?

- A contagious, destructive disease, caused by bacterium *Erwinia amylovora* affecting members of the family Rosaceae.
Overwintering cankers

Primary inoculum - bacteria on surfaces of old cankers

Carried by rain, wind, insects, etc. onto

Blossom epiphytic phase - bacteria multiplies on flowers (stigmas) and is carried by insects

Secondary infection - Shoots, fruits, rootstocks

Bacterial ooze

Blossom infection-potential - primary infection

M. Danilovich
Tools to Predict Infections

- Epidemiology models to predict blossom blight infections
  - Caugarblight
  - MaryBlyt

MSU Enviroweather:

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Min Temp (°F)</th>
<th>Max Temp (°F)</th>
<th>Avg Temp (°F)</th>
<th>Rain (in./chance)</th>
<th>Hours of leaf wetness recorded at station</th>
<th>Hours of leaf wetness (Recorded at apples, 40 inches above ground)</th>
<th>DD40</th>
<th>DD55</th>
<th>DH65</th>
<th>EIP</th>
<th>Bactericide applied today?</th>
<th>Trauma</th>
<th>B</th>
<th>H</th>
<th>W</th>
<th>T</th>
<th>Progress toward symptoms</th>
<th>Risk</th>
<th>User changes</th>
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<tbody>
<tr>
<td>Sat</td>
<td>5/23</td>
<td>51</td>
<td>76.7</td>
<td>64.5</td>
<td>0 (obs. at stn.)</td>
<td>None</td>
<td>7</td>
<td>8</td>
<td>25</td>
<td>10</td>
<td>81</td>
<td>41</td>
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<td>-</td>
<td>(-)</td>
<td>+</td>
<td>0%</td>
<td>Medium</td>
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<tr>
<td>Sun</td>
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<td>57</td>
<td>73.6</td>
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<td>3</td>
<td>0</td>
<td>25</td>
<td>10</td>
<td>38</td>
<td>61</td>
<td>-</td>
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<td>(-)</td>
<td>+</td>
<td>0%</td>
<td>Medium</td>
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<tr>
<td>Mon</td>
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<td>58.9</td>
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<td>(-)</td>
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<td>243</td>
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<td>-</td>
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<td>(-)</td>
<td>+</td>
<td>0%</td>
<td>High</td>
<td></td>
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<tr>
<td>Wed</td>
<td>5/27</td>
<td>67.4</td>
<td>81.4</td>
<td>74.9</td>
<td>0 (obs. at stn.)</td>
<td>None</td>
<td>1</td>
<td>0</td>
<td>35</td>
<td>20</td>
<td>238</td>
<td>335</td>
<td>-</td>
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<td>+</td>
<td>0%</td>
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B – Open blossom; H – Epiphytic Infection Potential \( \geq 100 \) W – Wetting event; T – Temperature > 60°F
<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Min Temp (°F)</th>
<th>Max Temp (°F)</th>
<th>Avg Temp (°F)</th>
<th>Rain</th>
<th>Dew/fog/spray</th>
<th>Hours of leaf wetness recorded at station</th>
<th>Hours of leaf wetness (Recorded at apples, 40 inches above ground)</th>
<th>DD40</th>
<th>DD55</th>
<th>DH65</th>
<th>EIP</th>
<th>Bactericide applied today?</th>
<th>Trauma</th>
<th>B</th>
<th>H</th>
<th>W</th>
<th>T</th>
<th>Progress toward symptoms</th>
<th>Risk</th>
<th>User changes</th>
</tr>
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<tbody>
<tr>
<td>Thu</td>
<td>5/28</td>
<td>57.4</td>
<td>75.8</td>
<td>67.1</td>
<td>0.1</td>
<td>None</td>
<td>10</td>
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<td>290-</td>
<td>-</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>11.7%a</td>
<td>Infection</td>
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<tr>
<td>Fri</td>
<td>5/29</td>
<td>55.3</td>
<td>66</td>
<td>59.8</td>
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<td>165 -</td>
<td>-</td>
<td>++</td>
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<td>+</td>
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<td>16.4%a</td>
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</tr>
<tr>
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<td>3</td>
<td>0</td>
<td>15</td>
<td>2</td>
<td>0</td>
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<td>110 -</td>
<td>-</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>18.2%a</td>
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<tr>
<td>Sun</td>
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<td>7</td>
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<td>0</td>
<td></td>
<td>0 -</td>
<td>-</td>
<td>+</td>
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<td>(-)</td>
<td>-</td>
<td>18.3%a</td>
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<tr>
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<td>23.8%a</td>
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<tr>
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<td>1</td>
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<td>18</td>
<td>187</td>
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<td>++</td>
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<tr>
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<td>79.1</td>
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<td>1.22</td>
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<td>28</td>
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<td>++</td>
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<td>+</td>
<td>+</td>
<td>53.9%a</td>
<td>Infection</td>
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<tr>
<td>Thu</td>
<td>6/4</td>
<td>53.3</td>
<td>77.2</td>
<td>66</td>
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<td>None</td>
<td>1</td>
<td>0</td>
<td>26</td>
<td>11</td>
<td>82</td>
<td>187</td>
<td>-</td>
<td>-</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>64.7%a</td>
<td>Infection</td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td>6/5</td>
<td>51.6</td>
<td>74.9</td>
<td>62.6</td>
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<td>None</td>
<td>12</td>
<td>0</td>
<td>23</td>
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<td>48</td>
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<td>(+)</td>
<td>-</td>
<td>+</td>
<td>72.3%a</td>
<td>High</td>
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</table>
Apple Flower Bud Phenology

Mirjana Bulatovic-Danilovich, WVU Extension Horticulture Specialist

Silver Tip  Green Tip  ½” Green  *TCLST  Pink
*OCLST  King Bloom  Full Bloom  *PTFL

*TCLST – Tight Cluster  *OCLST – Open Cluster  *PTLF – Petal Fall

Photos credit: Mira Danilovich
Old Fire Bligh Canker
Bacterial Movement

Bacteria “overtaking” stem, leaves and fruit

Old overwintering canker as source of infection

Oozing bacteria - Bartlett

Photos by: M. Bulatovic-Danilovich
What to Do About it?

- **Prevention:**
  - *Plant resistant varieties:* Red delicious, Enterprise, Gold Rush, Wolf River
  - *Avoid:* Honeycrisp, Golden delicious, McIntosh, Gala, Fuji

- **Sanitation:**
  - *Prune out infected shoots and limbs, remove cankers*

- **Cultural management:**
  - *Cut down on nitrogen fertilizers*
Fire Blight – Early Management

Start early-
look for
CANKERS

- Champ WP (Copper hydroxide)
- NuCop50DF (Copper hydroxide)
- Basic Cu 53 (Copper hydrate pentahydrate)
- Magna-Bon CS2005 (Cu-culfate pentahydrate)
- Bedge X2 (Cu-oxychloride and Cu-hydroxide)
- COC WP (Cu-oxychloride)

Copper spray
as trees break
dormancy

- Streptomycin (Agri-Mycin, Kasugamycin, FireWall) when the risk is MH and H
- Oxitetracyclyne (Myco-Shield, FlameOut, FireLine) – when risk is ML, M
- Serenade (*Bacillus subtilis* QST 713) – when risk is ML, M

For Blossom
Blight Control

Prune cankers out in full dormancy

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Mid-season Control – Infection Present

- Main defense mechanism is to prune the fire blight strikes out
- Since the temperatures and humidity are likely to be high, make sure you choose a dry day ...make a cut to remove the strike and leave the stub that you would spray paint with a neon-color that would be easily visible in winter/early spring when you need to finish the cut by cutting 12-18” below that painted stub
- Remove the clippings and burn them or dispose of them through garbage. Do not put them on a compost pile
- Pruning tools (shears, loppers) must be disinfected after each cut by dipping them into 10% bleach solution or in 70% rubbing alcohol to prevent cut-to-cut transmission
- Step up insect control to prevent wounding of the tender tissue
- Use of material that would slow-down the growth rate
Shoot Blight Control

Apogee (prohexodione-Ca)

1\textsuperscript{st} App. At King Bloom Petalfall followed with 2-3 more applications 2 weeks apart.

Apogee Trials for Fire Blight Control: P. Schwallier, MSU

M. Danilovich

UTC Apogee - 2001

Cortland
# Apogee Application Timing & Rates

<table>
<thead>
<tr>
<th>Tree Size</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4. *optional</th>
<th>Total for Season</th>
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<tbody>
<tr>
<td>Small</td>
<td>5 oz.</td>
<td>4 oz.</td>
<td>4 oz.</td>
<td>4* oz.</td>
<td>17 oz.</td>
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<tr>
<td>&lt;150 TRV</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Medium</td>
<td>6 oz.</td>
<td>5 oz.</td>
<td>5 oz.</td>
<td>5*oz.</td>
<td>21 oz.</td>
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<tr>
<td>&lt;150 to 250 TRV</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Large</td>
<td>7 oz.</td>
<td>6 oz.</td>
<td>6 oz.</td>
<td>6*oz.</td>
<td>25 oz.</td>
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<tr>
<td>&gt;250 TRV</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Timing</td>
<td>KBPF</td>
<td>2 weeks after petalfall</td>
<td>2-3 weeks after 2\textsuperscript{nd}. app.</td>
<td>2-3 weeks after 3\textsuperscript{rd}. app.</td>
<td>Source: P. Schwallier, MSU</td>
</tr>
</tbody>
</table>

M. Danilovich
Disease Resistant Varieties

- **Very Early**
  - Ginger Gold

- **Early**
  - Duchess of Oldenburg
  - William’s Pride

- **Mid-Season**
  - Jonafree
  - Wolf River

M. Danilovich
Disease Resistant Varieties

<table>
<thead>
<tr>
<th>Late</th>
<th>Very Late</th>
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<tbody>
<tr>
<td>Liberty</td>
<td>Gold Rush</td>
</tr>
<tr>
<td>Enterprise</td>
<td>Norfolk Pippin</td>
</tr>
<tr>
<td>Adams’ Permain</td>
<td></td>
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<tr>
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</table>

M. Danilovich
Ginger Gold

- Moderately vigorous tree (12-15’)
- Blooms in mid-season. Has white pink-tinted flowers.
- Best varieties for cross-pollination are: Red delicious, Honeycrisp
- Ripens very early from July to early to mid-August depending on geographic location.
- Large, yellow apple, looks like Golden delicious (one of the parents) but crispier and with mildly tart flavor. Flesh is white and it takes a long time to turn brown making it a great choice for cut fruit in salads
Duchess of Oldenburg

- **Origin:** Russia, early 18th Century
- **Very hardy tree, very heavy producer**
- **Flowers in early-mid season**
- **Ripens early in a season**
- **Fruit is medium to large, very good flavor, aromatic, tart.**
- **Shows good tolerance to general diseases**
- **Most famous offsprings:** Northern Spy and Pinova
Duchess of Oldenburg identification photos from website visitors

http://www.orangepippin.com/opimages.ashx?i=147297_40730bbc4d3e45789082.jpg&s=1
Rate this variety for flavor

Current rating: 5.0 out of 5. Total votes cast: 2

Visitor comments
(Use the form at the bottom to add your own comments about this variety)

05 Aug 2014    Drew, BRITISH COLUMBIA, Canada
Our tree is quite old - our guess is it is at least 80+ years old. It produces upwards of 600+ pounds in a good year and 300+ pounds in a dry Summer. The apples are excellent for eating and apple sauce, as they break down too readily in pies.

06 Aug 2013    Stephanie, United States
We harvested 7-10 bushels of Duchess. I would use one word to describe the apple: Tart. I usually like tart apples, but Duchess is simply too tart.

17 Jun 2012    Charley, WA, SPOKANE COUNTY, United States
This is a good keeper in cold storage. Ours was good for cooking up until March this year 2012. When I use it for pie or apple crisp I like to add a little lime juice for tartness. Overall mild sweet taste.
Grimes Golden

Origin: Brooke County, West Virginia, 1790. Introduced in 1830s. “Super sweet with high sugar content and blasts of banana and anise flavors, it became the favorite of moonshiners and children alike. The first 'Golden Delicious' tree sprang from a 'Grimes Golden' seed.”
Grimes Golden

• Tree is moderately vigorous, winter-hardy, precocious, regular and abundant cropper
• Blooms in mid-season, early May
• Ripens in mid-late season
• Fruit is medium sized, oblong with a flat base. Green to yellow skin, bright golden yellow when ripe. Flesh is crisp, creamy colored with a spicy, aromatic flavor, refreshing
• Superior dessert quality, especially pies. Excellent for juice and cider
• Moderately tolerant to major apple diseases
Gold Rush

One of the latest ripening cultivars/November

Very high quality apple that looks like Golden delicious but has more complex taste, slightly tart, spicy, very crisp...improves with storage

It stores well up to 7 months in a cold storage

It is disease resistant

Good for fresh, baking and cider

http://www.saltspringapplecompany.com/img/apple_goldrush.png
List of fireblight-resistant apple varieties

A selection of apple varieties that have very good or some resistance to fireblight. Be sure to ask us about fireblight-resistant rootstocks too.

### Categories
- Our recommendations
- Apples
- Pears
- Crab-apples
- Cider

### Rootstocks
- Dwarf
- Semi-dwarf
- Semi-vigorous
- Vigorous

<table>
<thead>
<tr>
<th>Apple tree</th>
<th>Akane</th>
<th>In stock</th>
</tr>
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<tbody>
<tr>
<td><strong>Akane</strong></td>
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<td></td>
</tr>
<tr>
<td>Akane is an attractive early-season eating apple with a good pedigree and a sweet/sharp flavor.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>$29.00</strong></td>
<td>buy</td>
<td></td>
</tr>
<tr>
<td>- Picking season: Early</td>
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<td></td>
</tr>
<tr>
<td>- Keeping (of fruit): 1 week</td>
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<tr>
<td>- Gardening skill: Beginner</td>
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<tr>
<td>- Pollination group: 4</td>
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<tr>
<td>- Uses: Eating fresh</td>
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<tr>
<td>- Uses: Culinary</td>
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<td></td>
</tr>
<tr>
<td>- Uses: Juice</td>
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<tr>
<td>- Self-fertility: Not self-fertile</td>
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<table>
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<tr>
<th>Apple tree</th>
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<tbody>
<tr>
<td><strong>Antonovka</strong></td>
<td></td>
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</tr>
<tr>
<td>Antonovka is one of the most cold-hardy of all apple varieties.</td>
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<tr>
<td><strong>$29.00</strong></td>
<td>buy</td>
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<tr>
<td>- Picking season: Early</td>
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<tr>
<td>- Gardening skill: Beginner</td>
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<td>- Pollination group: 3</td>
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<td>- Uses: Eating fresh</td>
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<tr>
<td>- Uses: Culinary</td>
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<tr>
<td>- Self-fertility: Not self-fertile</td>
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</tr>
<tr>
<td>- Uses: Dual purpose</td>
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<th>Apple tree</th>
<th>Arkansas Black</th>
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<tbody>
<tr>
<td><strong>Arkansas Black</strong></td>
<td></td>
<td></td>
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<tr>
<td>Arkansas Black is an unusual and attractive apple, used as a winter apple after maturing in a cold store.</td>
<td></td>
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</tr>
<tr>
<td><strong>$29.00</strong></td>
<td>buy</td>
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</tr>
<tr>
<td>- Picking season: Late</td>
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<td></td>
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<tr>
<td>- Gardening skill: Average</td>
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<td>- Uses: Eating fresh</td>
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<td>- Uses: Culinary</td>
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<td>- Uses: Juice</td>
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<td>- Uses: Hard cider</td>
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<td>- Self-fertility: Not self-fertile</td>
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<tr>
<th>Apple tree</th>
<th>Bramley's Seedling</th>
<th>In stock</th>
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<tbody>
<tr>
<td><strong>Bramley's Seedling</strong></td>
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<tr>
<td>Bramley is the essential English cooking and sharp cider apple, famous for its rich tangy acidity.</td>
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<td></td>
</tr>
<tr>
<td><strong>$29.00</strong></td>
<td>buy</td>
<td></td>
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<tr>
<td>- Picking season: Late</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Gardening skill: Average</td>
<td></td>
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<tr>
<td>- Pollination group: 3</td>
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<tr>
<td>- Uses: Culinary</td>
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<tr>
<td>- Uses: Juice</td>
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<tr>
<td>- Uses: Hard cider</td>
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<tr>
<td>- Self-fertility: Not self-fertile</td>
<td></td>
<td></td>
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<tr>
<td>- Uses: Traditional cooker</td>
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</tr>
</tbody>
</table>

**Apple tree**

### Chieftain

A quietly popular apple, similar to Delicious but with a better and more complex flavor.

$29.00  buy

- Picking season: Late
- Keeping (of fruit): 1-2 months
- Gardening skill: Beginner
- Pollination group: 4
- Uses: Eating fresh
- Uses: Culinary
- Self-fertility: Not self-fertile

### Dayton

Dayton is an attractive red modern disease-resistant apple with crisp flesh and a sweet/tart flavor.

$29.00  buy

- Picking season: Mid
- Keeping (of fruit): 1-2 months
- Gardening skill: Beginner
- Pollination group: 3
- Uses: Eating fresh
- Self-fertility: Not self-fertile

### Empire

One of the most widely-planted McIntosh style apples, Empire has the Mac flavor but improves on it.

$29.00  buy

- Picking season: Late
- Keeping (of fruit): 2-3 weeks
- Gardening skill: Beginner
- Pollination group: 3
- Uses: Eating fresh
- Uses: Juice
- Self-fertility: Partially self-fertile

### Enterprise

Enterprise is a modern American disease-resistant apple, good for eating fresh and cooking.

$29.00  buy

- Picking season: Very late
- Keeping (of fruit): 3 months or more
- Gardening skill: Beginner
- Pollination group: 4
- Uses: Eating fresh
- Uses: Culinary
- Self-fertility: Not self-fertile
<table>
<thead>
<tr>
<th>Apple tree</th>
<th>In stock</th>
<th>Apple tree</th>
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<th>Apple tree</th>
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<th>Apple tree</th>
<th>In stock</th>
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</thead>
<tbody>
<tr>
<td>Fameuse</td>
<td></td>
<td>Florina</td>
<td></td>
<td>Freedom</td>
<td></td>
<td>Fuji (early)</td>
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<td>[Image]</td>
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<td>[Image]</td>
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<tr>
<td>A very hardy north country apple, known both as the Snow Apple and Fameuse, and the probable parent of McIntosh.</td>
<td>$29.00</td>
<td>A modern disease-resistant variety related to Jonathan and Golden Delicious.</td>
<td>$29.00</td>
<td>A modern disease-resistant apple variety, similar to McIntosh.</td>
<td>$29.00</td>
<td>Early ripening forms of the Fuji apple variety.</td>
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<tr>
<td>$29.00</td>
<td><strong>buy</strong></td>
<td>$29.00</td>
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<td>$29.00</td>
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<td>○ Picking season: Late</td>
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<td>○ Picking season: Late</td>
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<td>○ Picking season: Late</td>
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<td>○ Picking season: Mid</td>
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<td>○ Keeping (of fruit): 1-2 months</td>
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<td>○ Gardening skill: Average</td>
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<td>○ Gardening skill: Beginner</td>
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<td>○ Gardening skill: Beginner</td>
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<td>○ Gardening skill: Average</td>
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<td>○ Pollination group: 2</td>
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<td>○ Pollination group: 4</td>
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<td>○ Pollination group: 4</td>
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<td>○ Pollination group: 3</td>
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<td>○ Uses: Eating fresh</td>
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<td>○ Uses: Eating fresh</td>
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<td>○ Uses: Eating fresh</td>
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<tr>
<td>○ Self-fertility: Not self-fertile</td>
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</tbody>
</table>
Galarina
Galarina is best considered an improved, disease-resistant Gala (to which it is closely related).
$29.00  buy
- Picking season: Late
- Keeping (of fruit): 3 months or more
- Gardening skill: Beginner
- Pollination group: 3
- Uses: Eating fresh
- Self-fertility: Not self-fertile

GoldRush
GoldRush is a modern disease-resistant apple, like Golden Delicious but with a better tart/sweet balance. It is also one of the best new hard-cider varieties.
$29.00  buy
- Picking season: Very late
- Keeping (of fruit): 3 months or more
- Gardening skill: Beginner
- Pollination group: 3
- Uses: Eating fresh
- Uses: Culinary
- Uses: Hard cider
- Self-fertility: Not self-fertile

Grimes Golden
A high quality apple, Grimes Golden is probably the parent of Golden Delicious, but with a richer flavor.
$29.00  buy
- Picking season: Late
- Keeping (of fruit): 3 months or more
- Gardening skill: Average
- Pollination group: 3
- Uses: Eating fresh
- Uses: Culinary
- Uses: Juice
- Self-fertility: Self-fertile

Honeycrisp
Honeycrisp is a cold-hardy disease-resistant apple - it shows just how good modern apples have become.
$29.00  buy
- Picking season: Late
- Keeping (of fruit): 3 months or more
- Gardening skill: Beginner
- Pollination group: 4
- Uses: Eating fresh
- Self-fertility: Not self-fertile
Apple tree

**Hudson's Golden Gem**

A large yellow russeted apple with an excellent sweet flavor.

$29.00

- Picking season: Late
- Keeping (of fruit): 1-2 months
- Gardening skill: Beginner
- Pollination group: 3
- Uses: Eating fresh
- Uses: Juice
- Uses: Hard cider
- Self-fertility: Not self-fertile

Apple tree

**Keepsake**

A high-quality late-season eating apple, keeps well, and at its best in mid-winter.

$29.00

- Picking season: Very late
- Keeping (of fruit): 3 months or more
- Gardening skill: Beginner
- Pollination group: 4
- Uses: Eating fresh
- Self-fertility: Not self-fertile

Apple tree

**Kidd's Orange Red**

Kidd's Orange Red is one of the best Cox-style apples, aromatic, sweet, and easy to grow.

$29.00

- Picking season: Late
- Keeping (of fruit): 1-2 months
- Gardening skill: Beginner
- Pollination group: 3
- Uses: Eating fresh
- Uses: Juice
- Self-fertility: Not self-fertile

Apple tree

**King David**

A popular Arkansas variety with a rich southern flavor.

$29.00

- Picking season: Very late
- Keeping (of fruit): 1-2 months
- Gardening skill: Average
- Pollination group: 3
- Uses: Eating Fresh
- Uses: Culinary
- Uses: Juice
- Uses: Hard cider
- Self-fertility: Not self-fertile
Apple tree

Liberty

Liberty is a popular disease-resistant apple, large crops of bright red apples, similar to McIntosh.

$29.00 buy

- Picking season: Late
- Keeping (of fruit): 1-2 months
- Gardening skill: Beginner
- Pollination group: 2
- Uses: Eating fresh
- Uses: Juice
- Self-fertility: Not self-fertile

Apple tree

Novaspy

An improved form of Northern Spy, and an excellent all-round apple for northern areas.

$32.00 buy

- Picking season: Late
- Keeping (of fruit): 3 months or more
- Gardening skill: Average
- Pollination group: 3
- Uses: Eating fresh
- Uses: Culinary
- Uses: Juice
- Self-fertility: Not self-fertile

Apple tree

Redfree

A disease-resistant and cold-hardy summer apple with a sweet flavor, also known as Co-op 13.

$29.00 buy

- Picking season: Early
- Keeping (of fruit): 2-3 weeks
- Gardening skill: Beginner
- Pollination group: 3
- Uses: Eating fresh
- Self-fertility: Not self-fertile

Apple tree

Roxbury Russet

Roxbury Russet is probably the oldest apple variety originating from North America.

$29.00 buy

- Picking season: Late
- Keeping (of fruit): 3 months or more
- Gardening skill: Average
- Pollination group: 4
- Uses: Eating fresh
- Uses: Culinary
- Uses: Juice
- Self-fertility: Not self-fertile
Apple tree

SnowSweet®

A rich sweet-flavored red apple which grows best in the northern states.

$29.00  buy

- Picking season: Late
- Keeping (of fruit): 1-2 months
- Gardening skill: Beginner
- Pollination group: 3
- Uses: Eating fresh
- Self-fertility: Not self-fertile

Apple tree

Spartan

Spartan produces lots of crimson maroon apples, crunchy, sweet, easy to grow, and a delicate "vinous" flavor.

$29.00  buy

- Picking season: Late
- Keeping (of fruit): 1 week
- Gardening skill: Beginner
- Pollination group: 3
- Uses: Eating fresh
- Uses: Juice
- Self-fertility: Partially self-fertile

Apple tree

Spigold

A good-tasting cross between Northern Spy and Golden Delicious.

$29.00  buy

- Picking season: Late
- Keeping (of fruit): 3 months or more
- Gardening skill: Average
- Pollination group: 4
- Uses: Eating fresh
- Uses: Juice
- Self-fertility: Not self-fertile

Apple tree

Sundance™

A high-quality late-season eating apple, with excellent flavor and disease-resistant qualities.

$29.00  buy

- Picking season: Late
- Keeping (of fruit): 3 months or more
- Gardening skill: Average
- Pollination group: 4
- Uses: Eating fresh
- Self-fertility: Not self-fertile
Apple tree

**Sweet Sixteen**

Sweet 16 is a sweet-flavored apple, with good cold hardness.

$29.00 [buy]
- Picking season: Mid
- Keeping (of fruit): 1-2 months
- Gardening skill: Beginner
- Pollination group: 3
- Uses: Eating fresh
- Uses: Culinary
- Self-fertility: Not self-fertile

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Apple tree

**Williams’ Pride**

An early summer apple, with excellent disease-resistance and a pleasant tart flavor.

$29.00 [buy]
- Picking season: Very early
- Keeping (of fruit): 1-3 days
- Gardening skill: Average
- Pollination group: 2
- Uses: Eating fresh
- Uses: Juice
- Self-fertility: Not self-fertile

---

Apple tree

**Winecrisp™**

Winecrisp is a modern disease-resistant apple with a spicy flavor. Also known as Co-op 31.

$29.00 [buy]
- Picking season: Late
- Keeping (of fruit): 3 months or more
- Pollination group: 3
- Uses: Eating fresh
- Self-fertility: Not self-fertile

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Apple tree

**Zestar!**

A crisp attractive early-season apple which stores well.

$29.00 [buy]
- Picking season: Early
- Keeping (of fruit): 2-3 weeks
- Gardening skill: Average
- Pollination group: 1
- Uses: Eating fresh
- Self-fertility: Not self-fertile
Whitney Crab Apple
- Edible, small sweet fruit good for pickling and preserving
- Ripens in August-early September

Chestnut Crab Apple – Edible fruit
- Very long bloom period covers all early, med-season and early-late season bloomers.
- Excellent disease tolerance

Dolgo Crab Apple
- Edible, 1 inch-size fruit, sweet
- Aromatic white-pinkish flowers, blooms early
- Scab and fire blight resistant
Useful links

2020 Spray Bulletin for Commercial Tree Fruit Growers:
https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/456/456-419/ENTO-341w.pdf

Pest Management Guide: Home Grounds and Animals, 2020:

2019-2020 Midwest Fruit Management Guide:
Dr. Mira Danilovich
304-293-2620

3411 Agricultural Sciences Building
POB 6108
Morgantown, WV 26506-6108

mira.danilovich@mail.wvu.edu