Apple Diseases: Observation in 2020 and Recommendations for 2021 (Emphasizing Bitter Rot)

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1.

Major Diseases of Apples: South

- Fire blight (*Erwinia amylovora*)
- Scab (*Venturia inaequalis*)
- Rusts (*Gymnosporangium* spp.)
- Sooty blotch (*Peltaster fructicola, ...*)
- Flyspeck (*Zygophiala jamaicensis*)
- Fruit rots
  - Bitter rot (*Colletotrichum* spp.)
  - Black rot (*Botryosphaeria obtusa*)
  - White rot (*Botryosphaeria dothidea*)

2.

Apple Fire Blight: Management

- Pruning: Winter (blighted shoots & cankers); Summer (shoots, sunny day)
- Chemical applications
  - Copper: at silver tip
  - Streptomyces:
    - During bloom; follow MARYBLYT program or every 4-5 days
    - After hailstorms
    - Do not apply more than 4 times
  - Apply Apogee at late bloom

3.

Apple Fire Blight symptoms

4.

Disease cycle of apple scab

Primary Scab

Secondary Scab
Fungicide Resistance of Apple Scab Fungus – 2012

➢ Resistant to strobilurin fungicides (Sovran), thus other strobilurins (FRAC 11)
➢ Resistant to strol-inhibitor (DMI) fungicides (Rally), thus other DMIs (FRAC 3)
➢ Resistant to Dodine (FRAC M)

Apple Scab in Illinois: Managing

➢ Mowing leaves on the floor
➢ Apply urea (5%) [~ 40 lbs urea in 100 gal water per acre]
➢ Spray crabapples next to your orchard
➢ Spraying trees from green tip to 10 days after petal fall is essential

Apple Diseases Management: 2021

➢ Spring Diseases (scab, rusts)
  ❖ Green-Tip: Mancozeb + Inspire Super
  ❖ ½-Inch Green: Mancozeb + Fontelis
  ❖ Tight Cluster: Mancozeb + Inspire Super
  ❖ Apple Pink: Mancozeb + Fontelis
  ❖ Apple Bloom: Mancozeb + Inspire Super
  ❖ Petal Fall: Mancozeb + Fontelis
  ❖ 1st Cover: Mancozeb + Inspire Super

Mancozeb = Manzate PRO Stik
All sprays at 7-day interval
Mancozeb: 3 lb/A; Inspire Super: 12 fl oz/A; Fontelis: 20 fl oz/A

Summer fungal diseases

Apple black rot
Apple bitter rot
Apple white rot
Apple SB/FS

Development of Bitter Rot

➢ A small gray-brown fleck or circular brown spot is the first symptom
➢ Enlarging lesions remain circular, become slightly sunken in the center
➢ When the lesions are about 1 inch in diameter, small raised fruiting bodies (acervuli) form near the center of the lesion

Research on Bitter Rot

➢ Field surveys in 2019 & 2020
➢ Identification of pathogen species
➢ Laboratory fungicide testing
➢ Orchard fungicide testing ‘Honey Crisp’: for all summer diseases
Incidence of Bitter Rot in Illinois

- **2019**
  - Number of orchards surveyed: 22
  - Number of orchards with bitter rot: 12
  - Highest variety loss of bitter rot: 63%
- **2020**
  - Number of orchards surveyed: 30
  - Number of orchards with bitter rot: 20
  - Highest variety loss of bitter rot: 100%

Identified Species

- *Colletotrichum fioriniae* (Acutatum complex)
- *Colletotrichum siamense* (Gloeosporioides complex)

Bitter Rot Management: Orchard

- Apple variety: *Honey Crisp*
  at the UI Fruit Farm, Urbana, IL
- Experiments:
  - 2019: 12 treatments (7-, 10-, and 14-day application intervals)
  - 2020: 9 treatment (10- and 14-day application intervals)
### Apple Summer Disease Management in Illinois in 2019

<table>
<thead>
<tr>
<th>Treatment (Rate/Acre)</th>
<th>% Fruit with Bitter Rot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (untreated)</td>
<td>51.25</td>
</tr>
<tr>
<td>Captain BWDG (5 lb) + NanoPro (4 oz) – 7 Day</td>
<td>0.00</td>
</tr>
<tr>
<td>Merivon 4.18SC (5.5 fl oz) + captan BWDG (5 lb) – 10 Day</td>
<td>0.00</td>
</tr>
<tr>
<td>Merivon 4.18SC (5.5 fl oz) + captan BWDG (5 lb) – 14 Day</td>
<td>0.00</td>
</tr>
<tr>
<td>Merivon 4.18SC (5.5 fl oz) + captan BWDG (5 lb) – 7 Day</td>
<td>0.00</td>
</tr>
<tr>
<td>Merivon 4.18SC (5.5 fl oz) + captan BWDG (5 lb) – 2 Day</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Apple Summer Disease Management in Illinois in 2020

<table>
<thead>
<tr>
<th>Treatment (Rate/Acre)</th>
<th>% Fruit with Bitter Rot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (untreated)</td>
<td>5</td>
</tr>
<tr>
<td>Merivon 4.18SC (5.5 fl oz) + captan BWDG (5 lb) – 10 Day</td>
<td>0</td>
</tr>
<tr>
<td>Merivon (5.5 fl oz) + captan (5 lb) – 14 Day</td>
<td>0</td>
</tr>
<tr>
<td>Merivon (5.5 fl oz) + captan (5 lb) – All</td>
<td>0</td>
</tr>
<tr>
<td>Merivon (5.5 fl oz) + captan (5 lb) – 14 Day</td>
<td>0</td>
</tr>
<tr>
<td>Merivon (5.5 fl oz) + captan (5 lb) – 10 Day</td>
<td>0</td>
</tr>
<tr>
<td>Aprovia 0.83SC (7 fl oz) + captan (5 lb) – All</td>
<td>0</td>
</tr>
<tr>
<td>ProPhyt (4 pt) + captan (5 lb) – All</td>
<td>0</td>
</tr>
<tr>
<td>ProPhyt (4 pt) + captan (5 lb) – 14 Day</td>
<td>0</td>
</tr>
<tr>
<td>Merivon (5.5 fl oz) + captan (5 lb) – All</td>
<td>0</td>
</tr>
<tr>
<td>Ziram 76DF (6 lb) + captan (5 lb) – All</td>
<td>0</td>
</tr>
<tr>
<td>Ziram 76DF (6 lb) + captan (5 lb) – 14 Day</td>
<td>0</td>
</tr>
</tbody>
</table>

### Management of Summer Disease in Honey Crisp in Illinois: Fungicides

<table>
<thead>
<tr>
<th>Fungicide</th>
<th>FRAC</th>
<th>PHI (day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aprovia</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>Captain</td>
<td>M</td>
<td>0</td>
</tr>
<tr>
<td>Flint</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Merivon</td>
<td>7, 11</td>
<td>0</td>
</tr>
<tr>
<td>ProPhyt</td>
<td>33 (P 07)</td>
<td>0</td>
</tr>
<tr>
<td>Tupsin-M</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ziram</td>
<td>M</td>
<td>14</td>
</tr>
</tbody>
</table>

### Managing Bitter Rot and other Summer Disease of Apples in Illinois

- Do not allow bitter rot in your orchard
- Cultural practices are essential: Remove mummies and dead woods and burn them before bloom
- Use effective fungicides: Begin at petal fall

### Apple Diseases Management

- Summer Diseases (Fruit Rots and Sooty Blotch/Flyspeck):
  - Merivon + captan: Alternated with Tropsin-M + captan OR
  - Merivon + captan: Alternated with ProPhyt + captan
- Begin summer disease management at petal fall
- Spray at 10- or 14-day intervals