These recommendations are intended to serve as guidelines for commercial apple growers in Missouri. The pesticides and application rates listed are for given pest problems based on their effectiveness, economy, safety and general integration into control programs. The rates listed are based on the use of which chemicals to use, when to use them, and how they are applied must be made by the individual grower relative to his own experience, equipment, and special problems associated with his orchards. The accurate and efficient use of all pesticides requires careful selection of the most appropriate material and the rate required, critical timing of the application(s), and uniform, thorough coverage of the trees.

PECTICIDE SAFETY

Responsible use of pesticides also includes their safe storage and handling. Most pesticides are poisonous to people and animals. Handle them with care. Store them only in their original, labeled containers in a dry, locked location out of the reach of children and animals.

READ THE LABEL! Understand it. Know the toxicity of the material you are using and wear the appropriate protective clothing. The greatest hazard with most pesticides occurs during the spray tank.

PECTICIDE CERTIFICATION FOR GROWERS

Missouri’s pesticide law went into effect October 21, 1976. This law requires certification for commercial and a private applicators to purchase and apply restricted use pesticides as defined by the Environmental Protection Agency. Since several pesticides used routinely by fruit growers are potential restricted use materials, it is highly desirable that each grower become certified.

Commercial applicators or applicators who apply pesticides for hire must pass an examination administered by the Missouri State Department of Agriculture. Private applicators are required to attend a training program, but are not required to pass an examination. Training sessions are offered to both commercial and private applicators by the University of Missouri Cooperative Extension Service. Contact your local Extension Specialist for further information.

The correct amount of pesticide required for control in any given orchard is that amount contained in a volume of the recommended dilute mixture which, when applied as a spray, is sufficient to allow some run-off. Amounts applied in excess of this volume are wasted, and volumes of dilute spray less than that required for run-off commonly result in reduced pest control.

The dilute rates listed in these recommendations are based on a standard application of 400 gallons per acre to mature, standard double trees in full leaf (approx. 200 lb. leaf and planted 30-40 trees per acre). Thus, for a pesticide recommended for use at a concentration of 1 lb per 100 gallons of dilute spray, 1 lb of the material should be applied per acre of standard orchard as described above. (Smaller trees, requiring only 200 gallons to reach the run-off point, would require 2 lbs of the same material per acre.)

Experience has shown that the same amount of chemical normally applied as a dilute spray can be applied at a low-volume (LV) spray using less than the normal dilute volume. However, since little or no run-off occurs in LV applications, the total chemical should be applied per acre in dilute sprays in order to avoid sprays in excess of that needed for control. LV rates are generally calculated with the basic concept by multiplying the dilute rate by the gallons per acre of spray required and then subtracting 20% to adjust for the lack of run-off.

Repeated or excess spraying and application rates of that needed for control in low-volume sprays are both economically and ecologically unsound.

PECTICIDE SAFETY

Responsible use of pesticides also includes their safe storage and handling. Most pesticides are poisonous to people and animals. Handle them with care. Store them only in their original, labeled containers in a dry, locked location out of the reach of children and animals.

READ THE LABEL! Understand it. Know the toxicity of the material you are using and wear the appropriate protective clothing. The greatest hazard with most pesticides occurs during the spray tank.

PECTICIDE CERTIFICATION FOR GROWERS

Missouri’s pesticide law went into effect October 21, 1976. This law requires certification for commercial and a private applicators to purchase and apply restricted use pesticides as defined by the Environmental Protection Agency. Since several pesticides used routinely by fruit growers are potential restricted use materials, it is highly desirable that each grower become certified.

Commercial applicators or applicators who apply pesticides for hire must pass an examination administered by the Missouri State Department of Agriculture. Private applicators are required to attend a training program, but are not required to pass an examination. Training sessions are offered to both commercial and private applicators by the University of Missouri Cooperative Extension Service. Contact your local Extension Specialist for further information.

The correct amount of pesticide required for control in any given orchard is that amount contained in a volume of the recommended dilute mixture which, when applied as a spray, is sufficient to allow some run-off. Amounts applied in excess of this volume are wasted, and volumes of dilute spray less than that required for run-off commonly result in reduced pest control.

The dilute rates listed in these recommendations are based on a standard application of 400 gallons per acre to mature, standard double trees in full leaf (approx. 200 lb. leaf and planted 30-40 trees per acre). Thus, for a pesticide recommended for use at a concentration of 1 lb per 100 gallons of dilute spray, 1 lb of the material should be applied per acre of standard orchard as described above. (Smaller trees, requiring only 200 gallons to reach the run-off point, would require 2 lbs of the same material per acre.)

Experience has shown that the same amount of chemical normally applied as a dilute spray can be applied at a low-volume (LV) spray using less than the normal dilute volume. However, since little or no run-off occurs in LV applications, the total chemical should be applied per acre in dilute sprays in order to avoid sprays in excess of that needed for control. LV rates are generally calculated with the basic concept by multiplying the dilute rate by the gallons per acre of spray required and then subtracting 20% to adjust for the lack of run-off.

Repeated or excess spraying and application rates of that needed for control in low-volume sprays are both economically and ecologically unsound.

PECTICIDE SAFETY

Responsible use of pesticides also includes their safe storage and handling. Most pesticides are poisonous to people and animals. Handle them with care. Store them only in their original, labeled containers in a dry, locked location out of the reach of children and animals.

READ THE LABEL! Understand it. Know the toxicity of the material you are using and wear the appropriate protective clothing. The greatest hazard with most pesticides occurs during the spray tank.

PECTICIDE CERTIFICATION FOR GROWERS

Missouri’s pesticide law went into effect October 21, 1976. This law requires certification for commercial and a private applicators to purchase and apply restricted use pesticides as defined by the Environmental Protection Agency. Since several pesticides used routinely by fruit growers are potential restricted use materials, it is highly desirable that each grower become certified.

Commercial applicators or applicators who apply pesticides for hire must pass an examination administered by the Missouri State Department of Agriculture. Private applicators are required to attend a training program, but are not required to pass an examination. Training sessions are offered to both commercial and private applicators by the University of Missouri Cooperative Extension Service. Contact your local Extension Specialist for further information.

The correct amount of pesticide required for control in any given orchard is that amount contained in a volume of the recommended dilute mixture which, when applied as a spray, is sufficient to allow some run-off. Amounts applied in excess of this volume are wasted, and volumes of dilute spray less than that required for run-off commonly result in reduced pest control.

The dilute rates listed in these recommendations are based on a standard application of 400 gallons per acre to mature, standard double trees in full leaf (approx. 200 lb. leaf and planted 30-40 trees per acre). Thus, for a pesticide recommended for use at a concentration of 1 lb per 100 gallons of dilute spray, 1 lb of the material should be applied per acre of standard orchard as described above. (Smaller trees, requiring only 200 gallons to reach the run-off point, would require 2 lbs of the same material per acre.)

Experience has shown that the same amount of chemical normally applied as a dilute spray can be applied at a low-volume (LV) spray using less than the normal dilute volume. However, since little or no run-off occurs in LV applications, the total chemical should be applied per acre in dilute sprays in order to avoid sprays in excess of that needed for control. LV rates are generally calculated with the basic concept by multiplying the dilute rate by the gallons per acre of spray required and then subtracting 20% to adjust for the lack of run-off.

Repeated or excess spraying and application rates of that needed for control in low-volume sprays are both economically and ecologically unsound.
**EARLY COVER SPRAYS (7-10 DAY INTERVALS)**

- **Scab**: SULFUR mtw
- **Powdery mildew**: MANCOZEB 80W
- **Cedar apple rust**: Quino rust or DIKAR 80W

**Timing & Major Pests Involved**

**EARLY COVER SPRAYS (7-10 DAY INTERVALS)**

- **Benomyl 7 NTL**
- **Glyodin ' 5 NTL**

[2] Allowable residues at harvest expressed in parts per million (ppm). Sulfur and copper are exempt from a tolerance.

**SUMMER COVER SPRAYS (10 - 14 DAY INTERVALS)**

- **Timing & Major Pests Involved**

**CURRICULUM**

- **DIAZON 50W**

**Coating moi**: **DIATOP 80W**

- **IMIDAN 50W**

**SCALE**

- **DIATOP 50W**

**LATE COVER SPRAYS (10-14 DAYS)**

- **Scab**: CAPTAN 50W
- **Bot. rot**: ZINEB 75W
- **Sooty blotch**: FLICYAN SOW
- **Fungicide tolerance**: 1 lb. per 100 gal. (4 lb. per acre, LV) if applications must be made within 15 days of harvest. Remember to check the tolerance and interval chart for all pesticides used at this time to avoid applying materials later than the approved intervals before harvest.

**Apple Pesticide Tolerances, Days to Harvest, and Other Label Restrictions**

- **Benomyl**: 5 NTL
- **Glyodin**: 7 NTL
- **Mancozeb**: 1 lb. per 100 gal. (4 lb. per acre, LV)
- **Diazinon**: 0.75 lb.
- **Maneb**: 1 lb.
- **Folpet**: 1 lb.
- **Ferbam**: 0.25 lb.
- **Captan**: 0.5 lb.
- **Diak**: 0.2 lb.
- **Dikar**: 0.1 lb.
- **Sulfur**: 7 lb.
- **Captan**: 0.5 lb.
- **Folpet**: 0.25 lb.
- **Dikar**: 0.2 lb.
- **Sulfur**: 7 lb.
- **Captan**: 0.5 lb.
- **Folpet**: 0.25 lb.
- **Dikar**: 0.2 lb.
- **Sulfur**: 7 lb.
- **Captan**: 0.5 lb.
- **Folpet**: 0.25 lb.
- **Dikar**: 0.2 lb.
- **Sulfur**: 7 lb.

**Use of DIFOLATAN for Primary Scab Control.**

The retention and redistribution properties of DIFOLATAN 4F allow it to be applied once at green tip and provide good control of scab during bud development. Ordinarily, DIFOLATAN should be applied once at green tip, prior to the appearance of the first buds; however, under certain conditions, a second application may be recommended. DIFOLATAN must be reapplied at green tip if the first application was made at a green bud stage. The use of DIFOLATAN does not provide resistance to scab, but reduces the severity of the disease. The use of DIFOLATAN in this manner is dependent upon the amount of growth which occurs rather than the amount of time lapsed. Where bud development from green tip to pink is occurring, the disease is likely to develop rapidly. Where bud development is slow, DIFOLATAN may be applied again at green tip, prior to the appearance of the first buds; however, under certain conditions, a second application may be recommended. DIFOLATAN must be reapplied at green tip if the first application was made at a green bud stage. The use of DIFOLATAN in this manner is dependent upon the amount of growth which occurs rather than the amount of time lapsed. Where bud development from green tip to pink is occurring, the disease is likely to develop rapidly.

**After-Infestation Control of Primary Scab.**

All of the fungicides recommended in this schedule for apple scab are effective as protectants, i.e., they will prevent infections from occurring if they are applied before infection occurs. Except for SULFUR, many scab fungicides also have reasonable after- infection activity; i.e., they will stop infections already started if they are applied within a given time after the start of an infection period. An infection period occurs when the leaves are continuously wet for approximately 15 hr at 50°F or 9 hr at 60°F or above. A single application of most scab fungicides will show after-infection activity if applied within 18 hr after the start of an infection period at 60°F or within 24 hr at 90°F. Multiple applications of othericides (3 lb. per 100 gal.) or the recommended tank mix of BENOMYL = MANCOZEB after scab lesions are apparent will inhibit lesion development and sporulation. Applications made in a light rain can still be effective since timing and coverage appear to be more important than the amount of fungicide deposited on the leaves and fruit.

**Resistance to Fungicides.**

The use of BENTOMYL, exclusively for apple scab control has led to the development of resistance to this fungicide in other fruit areas by the scab fungus. To date, benzimidazole resistance has not been observed in Missouri. Prudent use of BENOMYL, in tank mixtures with other effective scab fungicides (CAPTAN, MANCOZEB) is recommended to reduce the chances for resistance to develop. Where BENOMYL has been used as the predominant scab fungicide for 2 years or more, its use should be discontinued.
<table>
<thead>
<tr>
<th><strong>Local identifier</strong></th>
<th>MP264-1979</th>
</tr>
</thead>
</table>

**Source information**

<table>
<thead>
<tr>
<th>Format</th>
<th>Book</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content type</td>
<td>Text</td>
</tr>
<tr>
<td>Source ID</td>
<td>Gift copy not added to collection</td>
</tr>
</tbody>
</table>

**Capture information**

<table>
<thead>
<tr>
<th>Date captured</th>
<th>9/18/2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scanner manufacturer</td>
<td>Fujitsu</td>
</tr>
<tr>
<td>Scanner model</td>
<td>fi-7460</td>
</tr>
<tr>
<td>Scanning system software</td>
<td>ScandAll Pro v. 2.1.5 Premium</td>
</tr>
<tr>
<td>Optical resolution</td>
<td>600 dpi</td>
</tr>
<tr>
<td>Color settings</td>
<td>24 bit color</td>
</tr>
<tr>
<td>File types</td>
<td>tiff</td>
</tr>
</tbody>
</table>

**Derivatives - Access copy**

<table>
<thead>
<tr>
<th>Compression</th>
<th>Tiff: LZW compression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Editing software</td>
<td>Adobe Photoshop CC</td>
</tr>
<tr>
<td>Resolution</td>
<td>600 dpi</td>
</tr>
<tr>
<td>Color</td>
<td>grayscale</td>
</tr>
<tr>
<td>File types</td>
<td>pdf created from tiffs</td>
</tr>
<tr>
<td>Notes</td>
<td>Images cropped and brightened</td>
</tr>
</tbody>
</table>