

## MEASUREMENT CONVERSIONS

**1 fluid ounce** (fl. oz.) = 6 level teaspoons  
1 fluid ounce = 2 level tablespoons

**1 cup** = 8 fluid ounces  
**1 pint** (pt.) = 2 cups = 16 fluid ounces  
1 pint = 0.125 gallon

**1 quart** (qrt.) = 2 pints = 32 fl. ozs.  
1 quart = 0.25 gallon  
1 quart = 0.946 liter

**1 gallon** (gal.) = 4 quarts = 8 pints  
1 gallon = 16 cups = 128 fl. ozs.  
1 gallon of water weighs about 8.34 pounds

**1 pound** (lb.) = 16 weight ounces (ozs.)  
1 pound = 453.6 grams

**1%** = 10,000 parts per million (ppm)  
1% volume/volume = 1 gallon per 100 gallons

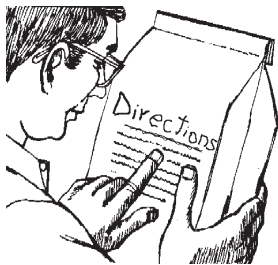
**1000 parts per million** = 0.1 %  
1000 ppm = 1 gram per liter

**1 acre** = 43,560 square feet  
209 feet x 209 feet = 1 acre

**1 mile** = 5,280 feet  
**1 mile per hour** (mph) = 88 feet per minute  
Feet per minute x 0.0114 = miles per hour

## PESTICIDE OPTIONS FOR BEARING TREES

**All suggested uses of pesticides in this publication are dependent on their continued state and federal registration. ALWAYS READ THE LABEL BEFORE USING ANY PESTICIDE. THE LABEL IS THE LEGAL DOCUMENT FOR THE PRODUCT USE.** Note compatibilities, safety precautions, amounts of material and timing of



sprays. Use accurately calibrated spray equipment. **Always follow label safety precautions and use required protective gear to protect yourself and others when applying pesticides.**

Refer to other sections of this publication for further information on the materials and uses listed here. No attempt has been made to include every pesticide registered for each pest, and no attempt has been made to list pesticides in order of preference. Pesticides are listed as brand name only, unless there are multiple products sold with the same active ingredient, in which case, the pesticide is listed by the most common brand name with the chemical name in parentheses.

The **Amount to use per 100 gallons dilute**

column shows the amount of pesticide formulation to mix into each 100 gallons of water if a “dilute application” is made. Spraying “dilute” means applying a volume of spray water sufficient to make all foliage surfaces wet enough so that the water begins to run off the leaves. If the spray will not be a dilute application (as is usually the case), then the amount of pesticide formulation to add to each 100 gallons of tankmix depends on the spray concentration.

See Part II: *Sprayer Calibration* for help on how to choose and calculate the spray concentration.

Accurate pesticide dosage depends on adjusting the dosage to tree size. For example, if the tree size and spacing is such that the dilute gallons per acre is 250 gallons, then (in most cases) the amount of a pesticide to use **per acre** would be 2.5 times the rate for 100 gallons. If you feel that orchard and application conditions allow it, pesticide dosage can also be further adjusted for concentrate spray application. See “Concentrate Spraying” in Part II: *Spray Strategies* for more information. **It is important to note that some materials require either a minimum amount per acre, or a specific amount per acres regardless of tree row volume**

See page 68 for key to abbreviations.



## LATE DORMANT - SILVER TIP

*When blossom buds begin to open and show silver tips*

### Key Monitoring:

Dormant

Inspect spurs and branches for European red mite egg density

Evaluate deer browsing damage.

Silver tip

Deploy tarnished plant bug traps

Deploy leafminer trunk traps

**Crown/Root/Collar Rot** - See Part I: *Other Apple Diseases -Phytophthora Collar, Crown, Root Rot*

### Fire blight

1. copper hydroxide (Champ, Champion, Kocide, many others)
2. copper oxychloride (COCS, others)
3. basic copper sulfate (Basicop, Blue Shield, many others)

**Amount to use per**

**100 gallons dilute**

**(dilute defined on page 126)**

see label

see label

see label

Copper application to trunks and branches can suppress population increase of overwintering fire blight bacteria, but will not eliminate the need for streptomycin during bloom on susceptible cultivars if weather conditions for a fire blight outbreak occur. Thorough coverage of the entire tree is necessary for maximum effectiveness, so dilute or high gallonage-low concentrate application is best. Treatment should be made to all trees harboring fire blight inoculum, not just those at greatest risk from fire blight infection. Adding spray oil at 1 quart per 100 gallons of spray solution (i.e. do not concentrate the oil) improves efficacy, but also increases the chance of phytotoxicity. Copper is an effective protectant against apple scab, but is likely to cause injury if applied beyond 1/4-inch green, especially under slow drying conditions. Avoid applying copper just before or after freezing temperatures.



**GREEN TIP**

*Just as buds break and green tissue is visible from side*

**Key Monitoring:**

Scab infection periods  
Check tarnished plant bug and leafminer traps.

Inspect buds for damage by cutworms or pear thrips.  
Evaluate European red mite egg density.

**Fire blight** - Same as Late Dormant/Silver Tip

**Apple scab**

1. Syllit 65WP <sup>1</sup>
2. Captan 50WP
3. Captan 80WP
4. Captec 4L
5. Topsin M 70WP + protectant fungicide <sup>1</sup>
6. Vangard 75WG

**Amount to use per  
100 gallons dilute  
(dilute defined on page 126)**

- 6 ozs.
- 2 lbs.
- 1.25 lbs.
- 1 quart
- 2 - 3 ozs. Topsin M + protectant combination rate.
- 1.25 ozs. Alone, or 0.75 oz *plus* recommended rate of another fungicide

**EBDC fungicides <sup>2,3</sup>**

mancozeb products

8. Dithane M-45
9. Dithane DF Rain Shield
10. Dithane F-45
11. Manzate 200 DF
12. Penncozeb 75DF

maneb products

13. Maneb 75DF
14. Manex 4F

metiram

15. Polyram 80DF

**Prebloom Only    Prebloom Only    Extended Prog.**

<b>Dilute Rate Amt./100 gals.</b>	<b>Max. Amt. per Acre</b>	<b>Max. Amt. per Acre</b>
1.5 lbs.	6 lbs.	3 lbs.
1.6 lbs.	6.4 lbs.	3.2 lbs.
1.2 quarts	4.8 quarts	2.4 quarts
1.5 lbs.	6 lbs.	3 lbs.
1.5 lbs.	6 lbs.	3 lbs.
1.5 lbs.	6 lbs.	3 lbs.
1.2 quarts	4.8 quarts	2.4 quarts
1.5 lbs.	6 lbs.	3 lbs.

**1. Fungicide Resistance.** Some orchards in New England contain strains of the apple scab fungus that are resistant to Topsin-M and/or Syllit. In such blocks, growers are strongly advised to avoid the use of these materials. Topsin M also should be used only in combination with another protectant fungicide.

To reduce the potential for resistance to strobilurin fungicides (i.e., Flint, Sovran), do not exceed 3 consecutive applications of Flint or Sovran before switching to a non-strobilurin fungicide for at least 2 applications. Do not make more than 4 total applications of strobilurin fungicide per season.

**2. Use only one of the two EBDC programs** (Prebloom Only or Extended) on any particular area during a growing season. Certain EBDC labels (e.g. Dithane formulations) specifically state that the Extended Application Schedule is for use in tank mixtures with systemic fungicides.

**3.** If more than one product containing an EBDC active ingredient is used on a crop during the same growing season and the EBDC products used allow different maximum poundage of active ingredient per acre per season, then the total poundage of all such EBDC products used must not exceed the lowest specified individual EBDC product maximum seasonal poundage of active ingredient allowed per acre. Do not apply EBDC fungicide in Extended Program within 77 days of harvest.

## Apple Scab note for GREEN TIP, HALF-INCH GREEN, TIGHT CLUSTER

The need for fungicide protection against apple scab prior to Pink depends on the overwintering inoculum level, ascospore maturity, cultivar susceptibility, weather forecasts indicating probable scab infection periods, and fungicide selection. If you have determined that a block has low scab-risk using the sequential sampling technique described in the Apple scab section of Part I, then the first protectant fungicide application can be delayed until Pink or after three scab infection periods (but before the fourth infection period), whichever comes first.

### HALF-INCH GREEN



*When green tissue projects one half-inch from flower bud and one or two leaves ("mouse ears") have unfolded*

#### Key Monitoring:

Scab infection periods.  
Check tarnished plant bug and leafminer traps.

Establish vole monitoring stations (anytime prior to bloom).

**Amount to use per  
100 gallons dilute  
(dilute defined on p. 126)**

**Apple scab** — Same as Green Tip with the additional options of:

1. Flint 50WG 0.67 - 0.8 ozs.
2. Sovran 50WG 1.33 - 1.6 ozs.

Flint and Sovran are both strobilurin fungicides with potential for resistance development. Do not exceed three consecutive strobilurin applications before switching to a non-strobilurin fungicide for at least 2 applications. Do not exceed a total of 4 strobilurin applications per season.

**Do not mix Captan with oil; serious foliage injury can result.**

#### Dogwood Borer (trunk spray)

1. Lorsban 4E 1.5 qrts.
2. Lorsban 50 W 1.5 lbs.

#### European red mite (ERM), San Jose scale (SJS)

1. oil (superior horticultural spray type) 2 - 3 gals.

See oil entry in *Notes on Insecticides and Miticides* and labels for cautions and guidelines for tankmixing oil with other pesticides. Applying oil with or immediately after copper increases chance of phytotoxicity. Avoid applying oil before or after freezing or other cold temperatures.

#### Rosy apple aphid (RAA)\*, San Jose scale, Climbing cutworms

1. Lorsban (mixed with oil) 4E 8 - 16 fl. ozs.
2. Lorsban 50WS 0.5 - 0.75 lb.
3. Supracide 25WP 1- 3 lbs.

#### Rosy apple aphid or San Jose scale Only

4. Esteem 0.86EC \* Rosy apple aphid: 2.5-4 ozs.; San Jose Scale: 3.25 - 4 ozs.
5. Danitol 2.4 EC (Rosy apple aphid only) 2.7 - 5.3 fl. ozs.

\* Rosy apple aphid control more effective with application at Pink.

#### Tarnished plant bug (TPB) (where there is heavy early activity)

1. Digon, Dimate (dimethoate) 4EC 1 pint  
New Hampshire growers — see note inside the front cover of this publication.



## TIGHT CLUSTER

*Blossom buds plainly visible, packed tightly together; stems short*

### Key Monitoring:

Scab infection periods.

Check tarnished plant bug and leafminer traps.

Finish oil applications before warm weather ares mite egg hatch.

**Amount to use  
per 100 gallons  
Dilute (defined  
on page 126)**

### Apple scab

- |                |           |
|----------------|-----------|
| 1. Captan 50WP | 2 lbs.    |
| 2. Captan 80WP | 1.25 lbs. |
| 3. Captec 4L   | 1 quart   |

**Do not mix Captan with oil; serious foliage injury can result.**

- |   |   |
|---|---|
| 4. Topsin M 70WP + protectant fungicide | 2 - 3 ozs. Topsin M + protectant combination rate |
| 5. Syllit 65WP                          | 6 ozs.  |

**Do not use Topsin M or Syllit in orchards where resistance is suspected.**

- |  |  |
|--|--|
| 6. Vanguard 50WG                       | 1.25 ozs. alone <i>or</i> 0.75 oz. <i>plus</i> recommended rate of another fungicide |
| 7. EBDC fungicides                     | see Green Tip for rates and restrictions   |
| 8. Nova 40WP + protectant fungicide    | 1.5 - 2 ozs. Nova + protectant combination rate                                      |
| 9. Procure 50WS + protectant fungicide | 3 - 4 fl. ozs. Procure + protectant combination rate                                 |
| 10. Rubigan 1EC + protectant fungicide | 3 - 4 fl. ozs. Rubigan + protectant combination rate                                 |

See entry for each product in *Notes on Fungicides* for minimum rates and other information on using Nova, Procure, Rubigan (sterol inhibitor fungicides).

- |                 |                 |
|-----------------|-----------------|
| 11. Flint 50WG  | 0.67 - 0.8 ozs. |
| 12. Sovran 50WG | 1.33 - 1.6 ozs. |

Flint and Sovran are both strobilurin fungicides with potential for resistance development. Do not exceed 3 consecutive strobilurin applications before switching to a non-strobilurin fungicide for at least 2 applications. Do not exceed a total of 4 strobilurin applications per season.

### Powdery mildew

#### Sterol Inhibitor fungicides

- |                  |                                       |
|------------------|---------------------------------------|
| 1. Nova 40WP     | 1.5 - 2 ozs. + protectant fungicide   |
| 2. Procure 50WS  | 3 - 4 ozs. + protectant fungicide     |
| 3. Rubigan 1EC   | 3 - 4 fl. ozs. + protectant fungicide |
| 4. Bayleton 50DF | 1 - 2 ozs. + protectant fungicide     |

All of the sterol inhibitor (SI) fungicides, *except* Bayleton, are also effective against apple scab. Because of the potential for resistance, SI fungicides should always be used in combination with a protectant fungicide.

#### Strobilurin fungicides

- |                |                |
|----------------|----------------|
| 5. Flint 50WG  | 0.5 - 0.6 ozs. |
| 6. Sovran 50WG | 1.0 - 1.6 ozs. |

If using Flint, alternate with a sterol inhibiting fungicide. To reduce the potential for resistance development to strobilurins, do not exceed three consecutive strobilurin applications before switching to a non-strobilurin fungicide for at least 2 applications.

- |                                  |                    |
|----------------------------------|--------------------|
| 7. Sulfur -WP and F formulations | see label for dose |
|----------------------------------|--------------------|

Because of sulfur's short residual activity, reapply every 7 days for good results under high disease pressure.

## TIGHT CLUSTER continued

### Apple blotch leafminer (ABLM) and Spotted tentiform leafminer (STLM) adults

Ambush, Asana, Danitol, Pounce, or Vydate at rates shown below for tarnished plant bug may control leafminer moths and eliminate the need for treatment against first brood leafminer larvae. A single Thiodan application may be effective against leafminer moths if properly timed and directed to groundcover and lower limbs, but 2 or 3 applications may be required for adequate results.

### Dogwood Borer (Trunk Spray) - See Half-Inch Green

**Amount to use  
per 100 gallons dilute OR Per Acre  
(dilute defined on page 126)**

### European red mite

- oil (superior horticultural spray type) 1 - 2 gals.  
Decrease rate to 1 gallon/100 gals. dilute after clusters separate. Do not concentrate oil above 3X even if spraying at higher concentration. Oil efficacy is best at 1- 3X spray volume. See Part I: *Notes on Insecticides and Miticides - Oil* and labels for cautions and guidelines for tankmixing oil with other pesticides.
- Apollo 42SC 1 - 2 fl. ozs.  
Apollo label calls for minimum dosage of 4 fl. ozs. per acre regardless of tree row volume.
- Savey 50WP 3 ozs. per acre regardless of tree row volume.  
Do not use Savey and Apollo in the same crop year. Preferred timing for Savey is at Pink.
- Danitol 2.4 EC 4 - 5.3 fl. ozs.

### Rosy apple aphid See materials listed at Half-Inch Green

Digon, Thiodan, Ambush, Pounce, Asana and Vydate as listed below for tarnished plant bug are all rated fair to good against Rosy apple aphid (RAA). Application at Pink is better than at Tight Cluster for RAA control.

### Tarnished plant bug

- Azinphos-M 50WP or Guthion 50WP 10 ozs.
- Avaunt 5 - 6 ozs. Per Acre
- Imidan 70WP 1 lb.
- Digon, Dimate (dimethoate) 4EC \* 1 pint
- Thiodan (endosulfan) 50WP 1 lb.
- Thiodan (endosulfan) 3EC 2/3 quart
- Ambush 2EC \* 3.2 fl. ozs.
- Ambush 25WP \*, or Pounce 25WP \* 3.2 ozs.
- Danitol 2.4 EC 2.7 - 5.3 fl. ozs.
- Pounce 3.2EC \* 2 ozs.
- Asana 0.66EC \* 2 - 5.8 fl. ozs.
- Vydate 2L \* 1 pint

Vydate cannot be used after a Pick-Your-Own site is opened for public entry.

Notes: Ambush, Pounce, Asana and Digon are rated excellent for tarnished plant bug control. The other materials are rated poor, but may provide adequate results with moderate pest density. Materials marked with \* are more detrimental to arthropod biological control agents than the other options.



**PINK**

*Petals pink, blossom buds separated and elongated*

**Key Monitoring:**

- Scab infection periods.
- Check tarnished plant bug and leafminer traps.
- Set traps for European apple sawfly.

- Fruit cluster examination for rosy apple aphid.
- Watch for wilted shoots on young unsprayed trees caused by apple pith moth larvae.

**Apple scab** - Same as Tight Cluster, except that if you choose Vanguard it must now be combined with the recommended rate of a protectant fungicide.

**Powdery mildew** - Same as Tight Cluster.

**Rusts** - SI fungicide (see Tight Cluster: Powdery mildew) or EBDC fungicide (See Green Tip: Apple scab)

**Apple blotch leafminer, Spotted tentiform leafminer**

Optimum time to evaluate and treat for first brood leafminer sap-feeding larvae is at First Cover. As a response to an over-threshold prebloom population of leafminer moths, Ambush, Asana, Esteem, Intrepid, Pounce, or Vydate applied at Pink may eliminate the need for treatment against first brood leafminer larvae. Because of its potential effect on fruit set, do not use Vydate after early Pink (after blossom clusters have separated).

**Dogwood Borer (Trunk Spray) - See Half-Inch Green**

**European red mite**

- 1. oil (superior horticultural spray type)

As a single application, or as follow-up to earlier oil application. Oil at late/extended Pink may cause petal burn. Apply at early/tight Pink. See oil entry in Part I: *Notes on Insecticides and Miticides* and labels for cautions and guidelines for tankmixing oil with other pesticides.

- 2. Apollo 42SC \*

Apollo label calls for minimum dosage of 4 fl. ozs. per acre regardless of tree row volume.

- 3. Savey 50WP \*

\* Do not use Savey and Apollo in the same crop year.

If neither oil, Apollo or Savey are used; one of the following miticides can be used. However, this approach is not recommended. It is better to reserve Kelthane, Pyramite, and Vendex for use as summer mite suppressants. Carzol cannot be used after petal fall, but is also not a preferred option at Pink as it is likely to allow the European red mite population to exceed threshold earlier in the summer than oil, Apollo, or Savey, and is detrimental to beneficial arthropods.

- a. Carzol 92SP
- b. Kelthane 50WP
- c. Pyramite 60WS
- c. Vendex 50WP

**Amount to use per  
100 gallons dilute OR Per Acre  
(dilute defined on page 126)**

1 gal.

1 - 2 fl. ozs.

3 ozs. per acre regardless of tree row volume.

4 - 5 ozs.

2 lbs.

2.2 ozs.

4 - 8 ozs.

## PINK continued

### European apple sawfly (EAS), Green fruitworms (GFW)

Treatment at Pink for European apple sawfly or Green fruitworms is only recommended if block history indicates that Petal Fall treatment will be inadequate. If treatment at Pink is needed, choose from materials listed at Petal Fall. Although not specifically labelled for EAS, Lorsban 50W applied at Pink against Rosy apple aphids will also provide good control of EAS.

### Rosy apple aphid

1. Lorsban 50WS
2. Thiodan (endosulfan) 50WP
3. Diazinon 50WSB
4. Danitol 2.4 EC

**Amount to use per  
100 gallons dilute  
(dilute defined on page 126)**

0.75 lb.  
1 lb.  
1 lb.  
2.7 - 5.3 fl. ozs

If Ambush, Pounce, Asana, dimethoate (Digon, Dimate), Vydate or oil are used at Pink for other pests, those materials also suppress Rosy Apple Aphids (RAA). Guthion (azinphosmethyl) or Imidan at Pink also contribute to RAA suppression, but both are rated poor for efficacy against RAA.

### Tarnished plant bug

If treatment is needed for TPB at Pink, choose from insecticides listed under Tight Cluster, except do not use Vydate after early Pink (after blossom clusters have separated). If an insecticide effective against TPB was used at Tight Cluster, then a Pink spray for this pest is probably not needed.

## PROTECT POLLINATORS FROM INSECTICIDES

**Check Table 16 for product selection and timing. Blooming clover, dandelion, and other groundcover plants attract pollinators. Reduce pollinator risk by mowing groundcover closely before applying insecticides.**





## BLOOM

*One or more open blossoms per tree, until 95% of blossoms have fallen*

### **Key Monitoring:**

Weather monitoring for Apple scab and Fire Blight infection periods.

Note pollinator activity and weather influences on subsequent thinning decisions.

Assess Calyx end rot risk (extended wetting periods during Bloom through Petal Fall).

Watch for powdery mildew growth.

Shoot inspection for gypsy moth, green fruitworms, leafroller larvae.

Check European apple sawfly traps.

If using pheromone traps to help time codling moth sprays, set traps during bloom

Limb tapping for mullein plant bug nymphs

### **Apple scab**

1. Captan 50WP
2. Captan 80WP
3. Captec 4L

**Do not mix Captan with oil; serious foliage injury can result.**

4. Topsin M 70WP + protectant fungicide
5. Syllit 65WP

**Do not use Topsin M or Syllit in orchards where resistance is suspected.**

6. EBDC fungicides

see Green Tip for rates.

If an EBDC fungicide was applied earlier in the season at the Prebloom Only rate, EBDC use must stop at Petal Fall. The Extended Program allows use up to 77 days before harvest if the maximum amount per acre per season has not been exceeded. See Green Tip and *Notes on Fungicides* for additional information.

7. Nova 40WP + protectant fungicide

1.5 - 2 ozs. Nova + protectant combination rate.

8. Procure 50WS + protectant fungicide

3 - 4 fl. ozs. Procure + protectant combination rate.

9. Rubigan 1EC + protectant fungicide

3 - 4 fl.ozs. Rubigan + protectant combination rate.

See Part I: *Notes on Fungicides* for minimum rates and other information on using Nova, Procure, Rubigan (sterol inhibitor fungicides).

10. Flint 50WG

0.67 - 0.8 ozs

11. Sovran 50WG

1.33 - 1.6 ozs.

Flint and Sovran are both strobilurin fungicides with potential for resistance development. Do not exceed 3 consecutive strobilurin applications before switching to a non-strobilurin fungicide for at least 2 applications. Do not exceed a total of 4 strobilurin applications per season.

**Calyx end rot, Dry-eye rot** — See Part I: *Other Apple Diseases - Calyx end rot*

**BLOOM** continued

**Fire blight**

1. Agri-Mycin (streptomycin) 17WP
2. Agri-Mycin (streptomycin) 17WP  
*plus* 2 quarts Glycerin USP or CP Grade  
*or plus* 1 pint Regulaid

Apply streptomycin only when weather conditions indicate conditions are suitable for infection.  
See Part I: *Other Apple Diseases - Fire Blight* for descriptions of fire blight risk assessment models.

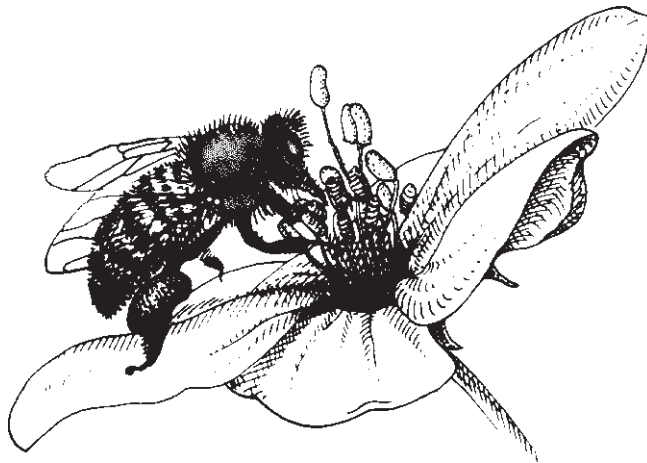
**Amount to use per  
100 gallons dilute  
(dilute defined on page 126)**

- 0.5 lb.  
0.25 lb.

**Powdery mildew** - Same as Tight Cluster

**Rusts** - Same as Pink

**TO PROTECT POLLINATORS — DO NOT APPLY INSECTICIDE DURING BLOOM OR UNTIL  
95% OF FLOWER PETALS HAVE FALLEN.**



## PETAL FALL

95% of petals fallen; Domestic and feral bees absent



### PROTECT HONEYBEES AND OTHER POLLINATORS

**Minimize blooming clover, dandelion and other groundcover by mowing groundcover closely before insecticide application.**

#### Key Monitoring:

Apple scab infection periods.

Note weather conditions and fruit set for thinning decisions.

Check traps for European apple sawfly before delaying Petal Fall spray.

Leaf inspection for European red mites, sapfeeding leafminer mines, white apple leafhoppers.

Shoot inspection for gypsy moth, green fruitworms, leafroller larvae.

Fruit inspection for fresh plum curculio egg-laying scars.

Limb tapping for mullein bug nymphs

Weed species identification.

**Apple scab** - Same as Bloom, but Syllit not recommended for protectant use after bloom because repeated use increases the chance of developing a resistant apple scab population, and because Syllit is not effective against flyspeck. Flyspeck infections may begin as early as Petal Fall.

If an EBDC fungicide was applied earlier in the season at the Prebloom Only rate, EBDC use must stop at Petal Fall. The EBDC Extended Program allows use up to 77 days before harvest if the maximum amount per acre per season has not been exceeded.

**Calyx end rot, Dry-eye rot** - See Part I: *Other Apple Diseases - Calyx end rot*

**Powdery mildew** - Same as Tight Cluster

**Rusts** - Same as Pink. See restrictions on the use of EBDC fungicides.

**Amount to use per  
100 gallons dilute OR Per Acre  
(dilute defined on page 126)**

#### **Apple blotch leafminer, Spotted tentiform leafminer, White apple leafhopper (WAL) \***

1. Agri-Mek 0.15EC + horticultural spray oil

2.5 fl. ozs.

2. Provado 1.6F

2 ozs.

3. SpinTor 2SC \*

1 - 2.5 fl. ozs.

4. Lannate 2.4L

12 fl. ozs.

5. Lannate 90SP

4 ozs.

Lannate cannot be used after a Pick-Your-Own site is opened to public entry.

6. Intrepid 2F

8 - 12 fl. ozs. Per Acre

Leafminer and leafhopper treatment is equally effective at First Cover, at which time population density can be more accurately evaluated. See European red mite for note on Agri-Mek dose and combination with penetrating adjuvant.

Agri-Mek, Lannate or Provado applied at Petal Fall may also control Rose leafhoppers that subsequently migrate into the orchard.

\* Intrepid and SpinTor not labeled for leafhoppers. Spintor must be applied with penetrating surfactant to be effective on leafminers. Additional options for White apple leafhopper are carbaryl (Sevin), Danitol, dimethoate (Digon, Dimate), and endosulfan (Thiodan). See Summer Pests for rates. Carbaryl (Sevin) applied within 30 days of Petal Fall is likely to act as a fruit thinner. Assail 70WP labeled for leafminer control, but efficacy rating not yet determined.

## PETAL FALL continued

### Dogwood Borer (Trunk Spray) \*

1. Lorsban 4E 1.5 qrts.
2. Lorsban 50W 3 ozs. Per Acre regardless of tree row volume

\* Lorsban can only be used post-bloom, as a trunk treatment for borers. Growers must be in possession of the supplemental label.

### European red mite \*

1. Agri-Mek 0.15EC + horticultural spray oil 2.5 ozs.  
Oil rate should be minimum of 1 quart/100 gallons dilute. Another penetrating adjuvant such as an organosilicone material may be substituted, but efficacy may not be as good as with oil.
2. Apollo 42SC 1 - 2 fl. ozs.
3. Vendex 50WP 4 - 8 ozs.  
Lower rate for prophylactic suppression. Higher rate suggested if treating a population over threshold.
4. Carzol 92SP 4 - 5 ozs.
5. Savey 50WP 3 ozs. Per Acre regardless of tree row volume
6. Stylet Oil or Ultra-Fine summer oil \* 0.5 - 2 gals.

\* For use in a 3-application program (Petal Fall, First Cover, and Second Cover). Use enough water per acre to make application at 1–3X concentration. Oil dose is for finished tankmix. Do not concentrate oil above 2 gallons oil per 100 gallons tankmix (2% oil). Chance of damage to leaves or fruit increases if tankmix concentration exceeds 2%.

Acramite, Kelthane or Pyramite may be used at Petal Fall if monitoring reveals that European red mites have reached the action threshold: otherwise reserve these materials for summer use if needed.

### European apple sawfly \*, Plum curculio (PC)

1. AzinphosM 50WP \*\* 10 ozs.
2. Guthion 50WP \*\* 0.5 - 0.75 lb.
3. Imidan 70WP \*\* 1 lb.
4. Avaunt 30DG 5 - 6 ozs. per acre
5. Danitol 2.4EC 4 - 5.3 fl ozs.
6. Surround 95WP \*\*\* 25 lbs.

\* Lannate is an additional option for European apple sawfly.

\*\* Treatments for PC with these materials should also control first generation Codling moth.

\*\*\* Surround for Plum Curculio only. Repeated application of Surround 95WP at 25 lbs./100 gals. dilute is required. See Part I: *Insect Pests - Plum curculio*, and Part II: *Notes on Insecticides: Surround* for more information.

### Green fruitworms \*, Obliquebanded leafroller (OBLR), Redbanded leafroller (RBLR)

1. Azinphos-M 50WP or Guthion 50WP 10 ozs.
2. Imidan 70WP 1 lb.
3. SpinTor 2SC \* 1 - 2.5 fl. ozs.
4. Pounce 3.2EC \*\* 2 ozs.
5. Bt endotoxin formulation (Agree, Dipel, MVP, etc.) see label
6. Confirm 2F 5 fl. ozs.
7. Lannate 2.4L 12 fl. ozs.
8. Lannate 90SP 4 ozs..  
Lannate cannot be used after a Pick-Your-Own site is opened to public entry.
9. Ambush 25WP or Pounce 25WP \*\* 3.2 ozs.
10. Asana 0.66EC \*\* 2 - 5.8 fl. ozs.
11. Danitol 2.4EC 4 - 5.3 fl. ozs.
12. Intrepid 2 F 8 - 16 fl. ozs. Per Acre
13. Avaunt 30DG \*\*\* 5 - 6 ozs. Per Acre

See next page for footnotes

## PETAL FALL continued

\* Intrepid and SpinTor are not labeled for Green fruitworms. SpinTor not labeled for Redbanded leafroller. Thiodan (endosulfan) is an additional option for Green fruitworms.

\*\* Ambush and Pounce labeled for use at, but not after Petal Fall. Postbloom use of pyrethroids (Ambush, Pounce, and Asana) is discouraged because of detrimental impact on beneficial arthropods.

\*\*\* Avaunt is labeled for Red banded leafroller only.

### Mullein Bug (MB)

Early hatching Mullein bug nymphs may cause damage during bloom. Apple fruit may be immune to mullein bug damage after petal fall, making control unnecessary. If Mullein bug nymphs require control, refer to materials listed above for European apple sawfly. Materials reported effective against Mullein bug are Provado, dimethoate (Digon, Dimate), Lannate and Asana. NH growers note that Mullein bug may not be listed as target pest on the label. See Part I: *Insect Pests - Mullein bug* for more information

### Rosy apple aphid (RAA)

Remaining infestations may be controlled at this time with Provado, Lannate or materials listed for RAA at pink, except for Lorsban and Vydate. Lorsban cannot be used on foliage post-bloom, and Vydate should not be used between early Pink and 30 days after Petal Fall. Most RAA damage has already occurred by Petal Fall and control is more difficult than at Pink.

### Tarnished plant bug (TPB)

The majority of tarnished plant bug damage occurs before Petal Fall, so treatment at this time offers little additional protection. If postbloom TPB control is needed, see materials listed at Tight Cluster. However, do not use Vydate within 30 days of bloom without consideration of its activity as a fruit thinner.

**FIRST COVER**  
*7 - 10 days after Petal Fall*



#### Key Monitoring:

Apple scab infection periods  
Watch for blossom clusters wilted by fire blight blossom infections, and powdery mildew growth on shoots.

Note weather conditions and fruit set for thinning decisions.

Leaf inspection for European red mites, sapfeeding leafminer mines, white apple leafhoppers.

Fruit inspection for fresh plum curculio egg-laying scars.

**Apple scab** - Same as Bloom, but Syllit not recommended for protectant use after bloom because repeated use increases the chance of developing a resistant apple scab population, and because Syllit is not effective against flyspeck. See EBDC note under Flyspeck.

**Calyx end rot, Dry-eye rot** - See Part I: *Other Apple Diseases - Calyx end rot*

**Amount to use per  
100 gallons dilute  
(dilute defined on page 126)**

#### Flyspeck \*, Sooty blotch

\* See Part I: Table 14 for more information on fungicide selection, rates, and suggested intervals

- |   |  |
|---|--|
| 1. Captan 50WP                          | 1 - 2 lbs.   |
| 2. Captan 80WP                          | 10 - 20 ozs.                                       |
| 3. Captec 4L                            | 1 - 2 pints  |
| 4. Topsin-M 70WP + protectant fungicide | 3 - 4 ozs. Topsin M + protectant combination rate. |
| 5. Flint 50WG                           | 0.67 - 0.8 ozs                                     |
| 6. Sovran 50WG                          | 1.33 - 1.6 ozs.                                    |

Flint and Sovran are both strobilurin fungicides with potential for resistance development. Do not exceed 3 consecutive strobilurin applications before switching to a non-strobilurin fungicide for at least 2 applications.

## SUMMER PESTS continued

Do not exceed a total of 4 strobilurin applications per season.

7. Ziram 76DF 1 - 1.5 lbs.
8. EBDC fungicides

If an EBDC fungicide was applied earlier in the season at the Prebloom Only rate, then use after Bloom is not permitted. The Extended Program allows use up to 77 days prior to harvest if the maximum amount per acre per season has not been exceeded.

### Powdery mildew

Same as Tight Cluster

### Rusts

Same as Pink. See restrictions on the use of EBDC fungicides.

### Apple blotch leafminer, Spotted tentiform leafminer, White apple leafhopper

Same as Petal Fall

### European red mite

Same as Petal Fall except for Carzol which cannot be used after Petal Fall

### Green fruitworms, Obliquebanded leafroller, Redbanded leafroller

Same as Petal Fall

### Plum curculio

Same as Petal Fall

## SUMMER PESTS

*(Need and timing for treatment determined by pest and weather monitoring)*

#### Key Monitoring:

##### First Cover -June 30

Intensive foliage and fruit inspection for scab lesions before relaxing fungicide protection. Note differences in appearance of scab lesions and spray burn or frog-eye leaf spots which can appear 1–3 weeks after bloom.

Where fire blight blossom infections noted earlier, check for shoot blight.

Foliage inspection for sap-feeding leafminer mines, white apple leafhopper.

Fruit inspection for fresh plum curculio egg-laying scars.

Regular inspection for European red mites and twospotted spider mites.

Set apple maggot traps by July 1 if using a trap-out strategy.

If using pheromone traps to identify optimum timing for leafminer and obliquebanded leafroller scouting, set traps two weeks after Petal Fall, checking weekly thereafter until 2<sup>nd</sup> flight date noted.

Degree day timing for 1<sup>st</sup> generation codling moth spray(s).

If San Jose scale is a problem, check for crawler

emergence 3–5 weeks after Petal Fall.

##### Key Monitoring -July

Regular inspection for European red mites and twospotted spider mites.

Set apple maggot monitoring traps in early July, weekly checking and maintenance thereafter.

Foliage inspection for 2<sup>nd</sup> generation sap-feeding leafminer mines, and where needed, obliquebanded leafroller.

Shoot inspection for apple aphid colonies.

Check foliage for new scab lesions.

Watch for apple pith moth damage and potato leafhopper damage on young low-spray trees.

##### Key Monitoring -August

Regular inspection for European red mites and twospotted spider mites.

Weekly monitoring and maintenance of apple maggot monitoring traps.

Leaf inspection for 2<sup>nd</sup> generation white apple leafhopper.

Branch inspection for Woolly apple aphid colonies.



## SUMMER PESTS continued

Degree day timing for 2<sup>nd</sup> generation codling moth spray(s).

Check lower trunks for borer infestation, especially on small diameter - low spray trees.

As late as possible in August: Preliminary apple scan indexing in case you have no time for a postharvest check. A preliminary index is too early to qualify a block because all eventual scab lesions may not yet show, but it can show which blocks have too much scab to be suitable for a delayed spray strategy next spring.

### Secondary Apple scab

Same as Bloom, but Syllit not recommended for protectant use after Bloom because repeated use increases the chance of developing a resistant apple scab population, and because Syllit is not effective against other diseases.

The EBDC Extended Program allows use up to 77 days before harvest if the maximum amount per acre per season has not been exceeded.

Apple scab lesions may not become visible until as much as 14 days (possibly longer with unusually hot or dry weather) after the last primary infection period. If orchard scouting confirms that scab infections have been successfully prevented through the primary season, then disease management can focus on preventing other summer diseases.

**Bitter rot** - See Bitter rot entry in Part I: *Other Apple Diseases - Bitter rot*

**Flyspeck, Sooty blotch, Bitter rot** - Same as First Cover

	<b>Amount to use per 100 gallons dilute OR Per Acre (dilute defined on page 126)</b>
<b>Apple aphid (AA), Spirea aphid (SA)</b>	
1. Thiodan (endosulfan) 50WP	1 lb.
2. Thiodan (endosulfan) 3EC	2/3 quart
3. Provado 1.6F	2 fl. ozs.
4. Digon, Dimate (dimethoate) 4EC	12 - 16 fl. ozs.
5. Lannate 2.4LV	6 - 12 fl. ozs.
6. Lannate 90SP	2 - 4 ozs.
7. Vydate 2L	1 - 2 pints
Lannate and Vydate cannot be used after a Pick-Your-Own site is opened for public entry.	
Assail 70WP labeled for aphid control but efficacy rating not yet determined	

### Apple blotch leafminer, Spotted tentiform leafminer

1. Esteem 0.86EC	2.5 - 4 fl. ozs.
2. Intrepid 2F	8 - 12 fl. ozs Per Acre
3. Provado 1.6F	2 fl. ozs.
4. SpinTor 2SC *	1 - 2.5 fl. ozs.
5. Vydate 2L *	0.5 - 1 pint
6. Lannate 2.4LV	12 fl. ozs.
7. Lannate 90SP	4 ozs.

Lannate and Vydate cannot be used after a Pick-Your-Own site is opened for public entry.

\* SpinTor not labeled for leafhoppers. Spintor must be applied with a penetrating surfactant to be effective on leafminers. Vydate applied within 30 days of Petal Fall may act as thinner. Assail 70WP labeled for leafminer control but efficacy rating not yet determined.

### Apple maggot fly (AMF)

1. Azinphos-M 50WP	8 ozs.
2. Guthion 50WP	8 ozs.
3. Imidan 70WP	12 - 16 ozs.
4. Sevin (carbaryl) 80S	1.25 lbs.

For other Sevin (carbaryl) formulations, see label. Sevin gives shorter duration of residual activity than

## SUMMER PESTS continued

the other insecticides listed, but can cause thinning if used within 30 days of Bloom.

- |                  |                     |
|------------------|---------------------|
| 5. Avaunt 30DG   | 5 - 6 ozs. Per Acre |
| 6. Danitol 2.4EC | 4 - 5.3 fl. ozs.    |

### Codling moth (CM), Lesser apple worm (LAW)

- |   |                   |
|---|-------------------|
| 1. Azinphos-M 50WP  | 8 ozs.            |
| 2. Guthion 50WP   | 8 ozs.            |
| 3. Imidan 70WP  | 12 - 16 ozs.      |
| 4. Confirm 2F   | 5 fl. ozs.        |
| 5. Bt endotoxin formulation (Agree, Dipel, MVP, etc.)                         | see label         |
| 6. Lannate 2.4LV  | 12 fl. ozs.       |
| 7. Lannate 90SP   | 4 ozs.            |
| Lannate cannot be used after a Pick-Your-Own site is opened for public entry. |                   |
| 8. Danitol 2.4EC  | 4 - 5.3 fl. ozs.  |
| 9. Esteem 0.86EC  | 3.25 - 4 fl. ozs. |
| 10. Intrepid 2F   | 12 - 16 fl. ozs.  |
- Assail 70WP labeled for codling moth but efficacy rating not yet determined

### Obliquebanded leafroller, Redbanded leafroller

Same as Petal Fall, but Ambush and Pounce cannot be used after Petal Fall.

### Dogwood borer

1. Lorsban 50WSB at 1.5 lbs./100 gallons or Lorsban 4E at 1.5 qrts./100 gals. applied as a trunk spray from mid-July to mid-August. Lorsban spray must be applied from within 4 feet of trunk and only to lower 4 feet of trunk. This treatment is also effective during pre-bloom and Petal Fall. Growers must be in possession of the Lorsban supplemental label for any post-bloom trunk sprays.

2. Thiodan (endosulfan) at 1.5 lbs./100 gallons trunk spray. First application in early July, second application in early August.

### European red mite, Twospotted spider mite (TSM)

- |                    |                |
|--------------------|----------------|
| 1. Pyramite 60WS   | 2.2 ozs.       |
| 2. Vendex 50WP     | 4 - 8 ozs.     |
| 3. Kelthane 50WP   | 2 lbs.         |
| 4. Apollo 42SC     | 1 - 2 fl. ozs. |
| 5. Agri-Mek 0.15EC | 2.5 fl. ozs.   |

Agri-Mek dose above 2.5 ozs. only recommended if target pest is TSM, or for application more than two weeks after Petal Fall when foliage is less able to absorb Agri-Mek. Agri-Mek application beyond 4 weeks after Petal Fall is not likely to offer residual control.

- |  |  |
|--|--|
| 6. Vydate 2L   | 1 pint   |
| Vydate cannot be used after a Pick-Your-Own blocks site is opened to public entry. |  |
| 7. Acramite 50WS   | 12 - 16 ozs. Per Acre                          |
| 8. Danitol 2.4EC   | 4 - 5.3 fl. ozs.                               |
| 9. Savey 50WP  | 3 ozs. Per Acre regardless of tree row volume. |

Rates shown are for ERM control. In most orchards, Pyramite is very effective against ERM, but only fair against TSM even at label limit of 3.3 ozs./100 gals. dilute. If TSM is the dominant mite pest, Vendex at 8 ozs./100, Vydate at 2 pints/100, or Agri-Mek at 5 ozs./100 give best chance for TSM control. Apollo requires 45 day preharvest interval.



**Plum curculio** - late adults, to maintain protection until 340 degree days (base 43° F) after Petal Fall.

- |                    |                     |
|--------------------|---------------------|
| 1. Azinphos-M 50WP | 0.5 lb.             |
| 2. Guthion 50WP    | 0.5 lb.             |
| 3. Imidan 70WP     | 14 ozs.             |
| 4. Avaunt 30DG     | 5 - 6 ozs. Per Acre |
| 5. Danitol 2.4EC   | 4 - 5.3 ozs.        |
| 6. Surround 95WP   | 25 lbs.             |

Repeated application of Surround 95WP at 25 lbs./100 gals. dilute is an option for plum curculio, but protection should be continuous from Petal Fall to 850 DD past Petal Fall. See Part II: *Notes on Insecticides - Surround* for more information.

### San Jose scale crawlers

- |                                  |                   |
|----------------------------------|-------------------|
| 1. Imidan 70WP                   | 12 - 16 ozs.      |
| 2. Guthion (azinphosmethyl) 50WP | 8 - 10 ozs.       |
| 3. Esteem 0.86 EC                | 3.25 - 4 fl. ozs. |
| 4. Provado 1.6F                  | 2 fl. ozs.        |

### White apple leafhopper, Rose leafhopper (RLH), Potato leafhopper (PLH)

- |  |                     |
|--|---------------------|
| 1. Thiodan (endosulfan) 50WP   | 1 lb.               |
| 2. Thiodan (endosulfan) 3EC  | 2/3 quart           |
| 3. Sevin (carbaryl) 80S  | 2/3 lb.             |
| 4. Danitol 2.4EC   | 2.7 - 5.3 fl. ozs.  |
| 5. Provado 1.6F  | 1 - 2 fl. ozs.      |
| 6. Lannate 2.4LV *   | 12 fl. ozs.         |
| 7. Lannate 90SP *  | 4 ozs.              |
| 8. Vydate 2L *   | 0.5 - 1 pint        |
| * Lannate and Vydate cannot be used after a Pick-Your-Own site is opened for public entry. |                     |
| 9. Digon, Dimate (dimethoate) 4EC  | 0.5 - 1 pint        |
| 10. Avaunt 30DG  | 5 - 6 ozs. Per Acre |
| 11. Surround 95WP  | 25 lbs.             |

Assail 70WP labeled for leafhoppers but efficacy rating not yet determined.

### Woolly apple aphid (WAA)

- |                                   |                  |
|-----------------------------------|------------------|
| 1. Thiodan (endosulfan) 50WP      | 8 -16 ozs.       |
| 2. Thiodan (endosulfan) 3EC       | 2/3 quart        |
| 3. Provado 1.6F                   | 2 fl. ozs.       |
| 4. Digon, Dimate (dimethoate) 4EC | 12 - 16 fl. ozs. |

## POST HARVEST

### Key Monitoring:

Apple scab assessment to qualify delayed spray strategy blocks for the following spring.

Harvest bin and storage/packing line records of insect and disease damage.

Evaluate need for control of perennial/woody weeds.

Evaluate vole population threat.

Assess protection from deer browsing.

Note trees with early reddening leaves as sign of crown/collar/root rot, vole damage, or borer infestation.

Check lower trunks for borer infestation, especially on small diameter - low spray trees.

**Crown / Root / Collar rot** - See Part I: *Other Apple Diseases -Phytophthora Collar, Crown, Root Rot*