

ABBREVIATIONS

cm = centimeter fl. ozs. = fluid ounces ft. = foot gal(s). = gallons(s) lb(s). = pound(s) ml = milliliter mm = millimeter mph = miles per hour oz(s). = weight ounce(s) psi = pounds per square inch	ppm = parts per million pt(s). = pint(s) qrt(s). = quarts /100 gals. = per 100 gallons tankmix for dilute spray /A = per acre > = greater than PHI = preharvest interval REI = restricted entry interval WSB = water-soluble bags	Dry Formulations DF = dry flowable DG = dry granule G = granule S or SP = soluble powder W or WP = wettable powder WS = water soluble powder WG or WDG = water dispersible granule	Liquid formulations EC = emulsifiable concentrate F = flowable SC = soluble concentrate L = liquid Common chemical names begin with a small letter. Brand names begin with a capital letter.
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NOTES ON PESTICIDES

This information is supplied with the understanding that no discrimination is intended and no endorsement by Cooperative Extension is implied. Pesticide uses indicated in this publication are believed to be in compliance with approved labels as registered with the U.S. Environmental Protection Agency (EPA) at the time of publication. However, pesticide labels are subject to change, and uses may be altered or revoked by EPA at any time. The pesticide user is responsible for being in compliance with laws in effect at the time of use. Current product labels are available from pesticide suppliers. If necessary, call the pesticide regulatory agency in your state for a copy of the current label. The following statements should not be construed as a substitute for reading pesticide labels, and they are not meant to contradict the labels in any way!

WARNING: Apple growers who also grow stone fruits or vegetables are advised to *avoid* using the fungicides *Abound*, labeled on stone fruits, and *Quadris*, labeled on vegetables. The active ingredient in these strobilurin fungicides is azoxystrobin which causes extreme phytotoxicity on certain apple cultivars.

NOTES ON FUNGICIDES and BACTERICIDES

AgriMycin (streptomycin sulfate): 17 WP (4–8 ozs./100 gals., see label for other rates) Bactericide used to prevent fire blight. Effective if used the day before, or the day of, a fire blight infection period. Where fire blight is expected to be a problem, the first spray is made after the first blossoms open when weather conditions favorable for the disease are present or predicted within 24 hours. Must be absorbed by the blossoms to be effective, should not be applied just before or during rain. The frequency of repeat applications depends on weather, blossom opening and disease pressure. Routine use to control shoot blight is not recommended. However, application within 24 hours after the beginning of a hail storm is recommended for *fire blight-threatened* orchards. Thorough coverage is essential for control. Application at concentration greater than 6X is not recommended. **Restricted entry interval 12 hours. Preharvest interval 50 days.**

Aliette (fosetyl AI): 80% WDG. Foliar application for control of Phytophthora crown and root rot on bearing and nonbearing apple trees. The material is absorbed by the foliage and transported to the roots. Avoid conditions that limit leaf absorption. Adjuvants which enhance pesticide penetration may cause phytotoxicity when mixed with Aliette. Do not apply within 2-3 weeks of leaf senescence on bearing trees. Under moderate disease pressure, apply 3 to 4 times at 5.0 lbs./100 gals. at a 60 day spray interval, or at 2.5 lbs./100 gals on a 30 day interval. Use no more than 5 lbs. Aliette per acre. Do not exceed 20 lbs. Aliette per acre per season. Should not be used as a season-long solution to wet soils which can lead to Phytophthora root rot, but rather as a way to maintain production until longer term solutions such as drainage or raised beds can be installed. Do not tankmix with copper compounds. **Restricted entry interval 12 hours. Preharvest interval 14 days for bearing trees; 12 months for non-bearing trees.**

Basicop: see coppers.

Bac-Master (streptomycin sulfate): Equivalent to 17% Streptomycin (4-8 ozs./100 gal., see label for other rates). This is a bactericide used to prevent fire blight. Streptomycin is effective if used the day before, or the day of, a fire blight infection period. Where fire blight is expected to be a problem, the first spray is made after blossoms open, when weather conditions favorable for the disease are present or predicted within 24 hours. Must be absorbed by the blossoms to be effective, should not be applied just before or during rain. The frequency of repeat applications depends on weather, blossom opening and disease pressure. Routine use of streptomycin to control shoot blight is not recommended. However, application within 24 hours after the beginning of a hail storm is recommended for fire blight-threatened orchards. Thorough coverage is essential for control. Application of streptomycin at concentration greater than 6X is not recommended. **Restricted entry interval 12 hours. Preharvest interval 50 days.**

Bayleton (triadimefon): 50% DF (0.5 – 2 ozs./100 gals.). Effective against powdery mildew and cedar apple rust. Not effective against apple scab. **Restricted entry interval 12 hours. Preharvest interval 45 days.**

Captan, Captec: 50% WP (2 lbs./100 gals.); 80% WP (1.25 lbs./100 gals.); 4L (0.75–1 quart/100 gals.). Effective against apple scab, black rot, Botrytisphaeria rot, Brooks spot, and blossom-end rot. Effective, but limited residual activity against sooty blotch, flyspeck and bitter rot. Not effective against rusts or powdery mildew. Has caused yellowing of leaves, leaf-spotting, and leaf drop on Delicious, Baldwin, Stayman and King when used within 3 weeks after petal fall. Do not use in combination with, closely following, or in alternation with sulfur products on these or other sulfur sensitive cultivars as severe injury and defoliation may occur. Not compatible with lime or other alkaline materials; it should not be applied to alkaline residues. Also, the use of spreaders which cause excessive wetting is not advised. Do not use in extreme cold or heat. **Do not use within 10 days before or after an oil application.** If captan treated fruit are to be sold for export, check for possible restrictions on captan tolerance. **Restricted entry interval 96 hours. Worker entry allowed after 48 hours with “early entry” protective equipment. Preharvest interval 0 days.**

coppers (fixed): Use as an early season scab protectant and as a bactericide to reduce the population of fire blight bacteria. Some formulations labeled for use as a drench to prevent *Phytophthora* crown rot. Sold under many trade names and formulations. Types include copper hydroxide (Champ, Champion, Kocide), copper oxychloride sulfate (COCS), and basic copper sulfate (Basic Copper 53, Basicop, Blue Shield). These formulations are called “fixed,” because the copper ion is relatively insoluble and less phytotoxic than in other coppers, such as copper sulfate (bluestone) used in Bordeaux mix. Application must be made as early as possible, no later than full green tip due to fixed copper’s ability to damage young foliage or cause russetting on fruit.

To further reduce russetting, use the lowest labeled rate of copper. See specific labels on adding hydrated lime to the tank-mix to reduce crop injury. **Restricted entry interval 24 hours for Basic Copper 53, Basicop, Champ, Champion, COCS, and Kocide. See labels for Preharvest intervals.**

EBDCs (EthyleneBisDithioCarbamates). Dithane, Manzate, Penncozeb (mancozeb); Maneb, Manex (maneb); Polyram (metiram): A group of closely related fungicides effective against apple scab, rust, black rot, flyspeck, sooty blotch and bitter rot. There are two programs under which EBDCs can be used: a high rate prebloom/bloom program limited to four applications; and a low rate extended program limited to seven applications. **Use only one of the two programs on any particular area.**

Prebloom/bloom only: Maximum of 4 applications of one of the following fungicides from 1/4 inch green through bloom.

EBDC Fungicide	Amount per 100 gals. dilute	Maximum per acre Limit
Dithane F-45, Manex	1.2 qrts.	4.8 qrts.
Dithane M-45 & Dithane Rainshield DF	1.6 lbs.	6.4 lbs.
Manzate 75DF	1.5 lbs.	6 lbs.
Penncozeb 75DF	1.5 lbs.	6 lbs.
Maneb 75DF & 80WP	1.5 lbs.	6 lbs.
Polyram 80DF	1.5 lbs.	6 lbs.

Extended Program: Use a maximum of 7 applications at 7–10 day intervals up to 77 days before harvest. The Extended Program maximum per acre limit is 3 lbs./acre for most dry formulations (see label), and 2.4 qrts./acre for liquid formulations.

For trees that require 250 gallons or less per acre for a dilute spray, full rate concentrate sprays made with a 20% reduction in the rate per 100 gals. dilute will not exceed the 3 pounds per acre Extended Program limit ($2.5 \times 1.5 \times 0.8 = 3$). Thus, on trees of this size, the EBDC fungicides can be used within the maximum amount per acre restriction of the Extended Program as a stand alone primary scab fungicide. If a 20% reduction in concentrate spray dosage is not appropriate due to thick canopies, high disease pressure or some other reason, application at the full 1.5 lbs./100 gals. dilute dose to trees requiring up to 200 dilute gallons per acre would not exceed the 3 pounds per acre limit.

Alternatively, the EBDCs can be used at reduced rates per 100 gals. dilute in combination with other fungicides. Combination rates are 0.75 – 0.80 lb./100 gals. for dry formulations, or 19 fl. ozs./100 gals. for liquid formulations.

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 for all the EBDC products must not exceed the lowest specified individual maximum seasonal limit for pounds of active ingredient allowed per acre.

Certain EBDC labels (e.g. Dithane formulations) specifically state that the Extended Program is for “Use in Tank Mixtures with Systemic Fungicides.”

Staying within the Extended Program maximum limit per acre has the advantage of allowing the use of these materials after bloom for early summer disease control. A disadvantage of postbloom EBDC application is their detrimental effect on predatory mites.

Toxic to fish, do not contaminate bodies of water with drift, runoff, or rinse water. **Restricted entry interval 24 hours. Preharvest interval 77 days** (using Extended Program).

Ferbam Granuflo: 76% WP. Moderately effective against scab. 2 lbs. /100 gals. if used alone for scab; 1 lb./100 gals. if used in combination with another more effective scab fungicide. Very effective against rusts; also some activity against Brooks spot, black rot and bitter rot. It has caused lenticel enlargement on some cultivars. May cause fruit russet on Golden Delicious and other sensitive cultivars if used before petal fall. Late-season use causes undesirable blotchy residue. May cause excessive pump wear in high

concentrate sprayers. **Restricted entry interval 24 hours. Preharvest interval 7 days.**

Flint (trifloxystrobin): 50% WDG (0.67 ozs./100 gals.) Apply a minimum of 0.67 oz. per acre even on small trees; maximum of 2.5 ozs. per acre per application. Flint belongs to the strobilurin group of fungicides. Effective against apple scab, powdery mildew, and sooty blotch and flyspeck. Against apple scab, it has 72-96 hours of post-infection activity and 6-10 days of protective activity. Strobilurin resistance is a major concern. Do not exceed 4 total applications of any strobilurin fungicide (i.e., Flint or Sovran) per season. Do not exceed 3 consecutive strobilurin applications before rotating to a non-strobilurin fungicide for at least 2 applications. If using Flint for powdery mildew or cedar apple rust management, the label requires alternation (every other application) with a sterol inhibitor fungicide. Flint has only “fair” activity against cedar apple rust. **See label requirements to minimize drift; spray drift is hazardous to Concord Grapes. Restricted entry interval 12 hours. Preharvest interval 14 days.**

Strobilurin Fungicides - General Information

The strobilurin fungicides include Flint and Sovran. They represent a relatively new class of fungicides that have activity against a number of pathogens including the fungi causing apple scab, sooty blotch, and flyspeck. The strobilurin fungicides have protective and post-infection activity against scab. They are considered better protectants than the sterol inhibitor (SI) fungicides. The strobilurins are absorbed by the waxy layers on the plant surface and re-distribute on the plant surface by diffusion in the gaseous phase. Therefore, ‘redistribution’ is local – either on the individual leaf or fruit. Thorough spray coverage is important. [Please note that in orchards with resistance to SI fungicides, the post-infection activity of the strobilurins may be less than 72-96 hours; however, the protectant activity appears to be unchanged.]

The strobilurins have a very specific mode of action (i.e., they inhibit fungal respiration by blocking electron transfer in the mitochondrial respiratory chain). Therefore, the potential for the development of resistance in the fungal population is high. They can be used alone; however, resistance management includes rotating to non-strobilurin fungicides after 2-3 consecutive applications of either Flint or Sovran and following restrictions on the total number of applications per season.

Strobilurins can be phytotoxic on crops on which they are not labeled. Flint spray drift is hazardous to Concord grapes; Sovran may cause injury to certain sensitive cherry varieties. See label requirements to avoid drift.

WARNING: Apple growers who also grow stone fruits or vegetables are advised to **avoid** using the fungicides *Abound*, labeled on stone fruits, and *Quadris*, labeled on vegetables. The active ingredient in these strobilurin fungicides is azoxystrobin which **causes extreme phytotoxicity on certain apple cultivars.**

Kocide: See coppers (fixed).

Maneb, Manex (maneb): See EBDCs.

Manzate 75DF (mancozeb): See EBDCs.

Nova (myclobutanol): 40W. Comes in a water-soluble pouch. Sterol-inhibitor (SI) fungicide effective against apple scab, powdery mildew and rusts. Excellent post-infection activity (96 hours), but limited protectant activity (3–5 days). Recommended for most uses at 1.25–2 ozs./100 gals. dilute. Use of Nova before tight cluster may not be economically efficient compared to protectant (contact) fungicides. Until late pink Nova may be applied alone, but it is recommended to combine it with a half-rate of a good protectant fungicide. The protectant fungicide may improve redistribution in cases where spray coverage is incomplete and thus give better protection of developing fruit. From petal fall on, Nova must be tank-mixed with a protectant fungicide. **Restricted entry interval 24 hours. Preharvest interval 14 days.**

Sterol Inhibitors - General Information:

Note that even with repeated applications, an SI fungicide may suppress scab development for a prolonged period, but not kill the fungus. If an SI fungicide (Nova, Procure, Rubigan) is applied after the beginning of a scab infection period during which the trees did not have fungicide protection, it is important that a follow-up SI application be made within 7 days using the higher end of the recommend rates per 100 gallons dilute (2 ozs./100 for Nova; 4 ozs./100 for Procure; 4 fl. ozs./100 for Rubigan). If an SI fungicide is first applied beyond 96 hours after the beginning of an unprotected infection period, then it is ESSENTIAL that at least one, and possibly two,

follow-up SI applications be made at 7–10 day intervals to adequately suppress scab that was left active after the initial application.

Unlike contact protectant fungicides, sterol inhibitor (SI) fungicides are not significantly redistributed with rain and must be absorbed into leaf tissue in order to be effective. The material must remain on the leaf at least one hour before being subject to washing off. Do not apply during rain. For concentrate spraying, do not reduce the amount of SI applied per acre. Use the same amount as would be applied for a dilute spray. Applications under slow drying conditions are most effective. Spraying at a concentration of greater than 6X is not recommended, especially under rapid drying conditions, because the spray droplets may evaporate before the fungicide has been absorbed into the leaf tissue. **Thorough spray coverage is essential for effective use of sterol inhibitor fungicides.** If conditions are excessively windy following an infection period, it is generally better to delay a needed SI spray until good application conditions are available and increase the dosage if necessary because of the delay, rather than sacrifice good coverage. Because of difficulty in achieving adequate spray coverage, SI fungicides are not recommended for use on trees that are over 24 feet tall, or for trees that have overly dense canopies because of poor pruning.

SI resistance is a problem in some parts of New York. If these materials are used a great deal in New England, resistance is expected to gradually develop. This potential for promoting SI-resistant scab needs to be considered in SI use decisions. See “Scab Management Strategies” in Part I for more information.

Penncozeb 75 DF (mancozeb): See EBDCs.

Polyram (metiram): See EBDCs.

Procure (triflumizole): 50% WS. Effective against apple scab, rust and powdery mildew. Excellent post-infection activity against scab (96 hours) with limited protectant activity (3 to 5 days). Procure is a sterol inhibiting fungicide (SI), the same type of material as Nova and Rubigan. Procure, and other SI fungicides, are not cost-effective if used after primary scab season. The most effective method for use of Procure, based on experience with other SI fungicides, is to limit it to applications during primary season, and use in combination with a half rate of a standard protectant fungicide. The protectant will

allow a longer interval between applications, improve fruit protection, and reduce the chance of resistance development. Applications should be at the rate of 3 to 4 ozs. per 100 gals., using the higher rate unless scab infection pressure is light. Do not use less than 8 ozs. per acre regardless of water volume applied or combination with a protectant fungicide. Do not exceed 64 ozs. per acre in a season. **Restricted entry interval 12 hours. Preharvest interval 14 days.** See “Sterol Inhibitors - General Information” under Nova entry for more information.

Ridomil Gold EC (metalaxyl): Systemic fungicide used against *Phytophthora* crown or root rot of apples, pears and stone fruits. Applied as a drench made from 1/2 pint of Ridomil Gold EC per 100 gallons water. Apply the mixture according to the following table:

Trunk Diameter	Quarts of Mixture per Tree
less than 1 inch	1 quart
1 to 3 inches	2 quarts
3 to 5 inches	3 quarts
greater than 5 inches	4 quarts

Apply drench around the trunk of trees in areas where *Phytophthora* root rot or crown rot is a problem. Apply in fall after harvest but before ground freezes; and in early spring after ground thaws but before growth starts. On new plantings, delay the first application until 2 weeks after planting.

May also be applied as a broadcast spray aimed at the root zone, designed to deliver 2 quarts Ridomil Gold EC per treated acre. “Treated acre” is the area actually sprayed, and is equivalent to 1.5 fl. ozs. per 1000 sq. ft. The soil surface treatment will not be effective until the fungicide is moved into the root zone by rainfall or irrigation. **Restricted entry interval 48 hours.**

Rubigan (fenarimol): 1 lb. active ingredient/gal. EC. Effective against apple scab, powdery mildew and rusts. Rubigan is a sterol inhibitor fungicide with excellent post-infection activity (72–96 hours.), but limited protectant activity (3 days). Recommended for use at 3–4 fl. ozs./100 gals. dilute, with the exact rate depending on the degree of post-infection activity required. The label calls for a minimum of 6 fl. ozs. per acre even if tree row volume indicates that a lesser amount is needed. Use of Rubigan at this rate before tight cluster may not be economically efficient compared to protectant (contact) fungicides. It is recommended that Rubigan be used in combination with a half rate of a good protectant fungicide at intervals not to exceed 10 days. The protectant

fungicide may provide better redistribution in cases where spray coverage is incomplete and improve protection of developing fruits. For post-infection use, maximum spray interval is 7 days. Do not apply more than 12 fl. ozs./acre per application, or more than 84 fl. ozs. /acre per season. **Restricted entry interval 12 hours. Preharvest interval 30 days.**

See “Sterol Inhibitors - General Information” under Nova entry for more information.

Serenade (*Bacillus subtilis*): (6-8 lbs/acre with no seasonal limits to number of applications). Serenade is a naturally occurring fungicide/bactericide containing the patented QST 713 strain of *Bacillus subtilis*. Recommended for control of fire blight; efficacy has been particularly good in blossom-blight management. Effective in alternation with streptomycin thus providing an effective tool for bacterial-resistance management. Also has some effectiveness against apple scab and powdery mildew but results may vary. Should be used as a protectant. Thorough coverage is essential for effective disease control. Non-toxic to beneficials, bees and non-target organisms. Qualifies for organic production (OMRI approved)—check with your certifying agency. **Restricted entry interval 4 hours. Preharvest interval 0 days.**

Sovran (kresoxim-methyl): 50% WG (1.0 – 1.6 ozs./100 gals.) Maximum of 6.4 ozs. per acre per application. Sovran belongs to the new strobilurin group of fungicides. Effective against apple scab, powdery mildew, sooty blotch and flyspeck. Provides post-infection activity to a maximum of 96 hours, and 6–10 days forward protection, against apple scab. Sovran has anti-sporulant activity if applied after scab lesions are visible. Provides excellent protection against flyspeck and will help suppress rust unless rust disease pressure is high. Development of Strobilurin resistance is considered a threat, so do not exceed 4 total strobilurin applications per season. Allow a minimum of 7 days between sequential applications of Sovran. Do not exceed 3 consecutive strobilurin applications before rotating to a non-strobilurin fungicide for at least 2 applications. Note label precautions on spray drift hazard to other crops. Growers are advised not to reduce the rate below 1.33 ozs./100 gals or development of disease resistance may be accelerated. **Preharvest interval 30 days. Restricted entry interval 12 hours.**

Streptrol (streptomycin sulfate): Equivalent to 17% Streptomycin (4-8 ozs./100 gal., see label for other rates). Bactericide used to prevent fire blight. Streptomycin is effective if used the day before, or the day of, a fire blight infection period. Where fire blight is expected to be a problem, the first spray is made after

Table 12 – Activity Spectrum of Apple Fungicides*

Fungicide ¹			Cedar-	Sooty Blotch		
	Apple Scab	Powdery Mildew	Apple Rust	Black Rot	& Flyspeck	Bitter Rot
Bayleton (triadimefon)	+	++++	++++	0	0	0
Captan	++++	0	+	+++	++ ⁴	++ ⁴
Dithane (mancozeb)	++++	0	++++	++++	++++	++++
Ferbam	++	0	++	+	++	+
Flint (trifloxystrobin)	++++	+++	++	+++	++++	++
Manzate, Penncozeb (mancozeb)	++++	0	++++	+++	++++	++++
Nova (myclobutanil) ⁵	++++	++++	++++	0	0	0
Polyram (metiram)	++++	0	++++	+++	++++	++++
Procure (triflumizole) ⁵	++++	++++	++++	0	0	0
Rubigan (fenarimol) ⁵	++++	++++	++++	0	0	0
Sovran (kresoxim-methyl)	++++	+++	++	+++	++++	++
sulfur	++	++	0	+	+	—
Syllit (dodine)	++++ ²	0	+	+	+	0
Thiram	++	0	++	+	++	+
Topsin M (thiophanate-methyl)	++++ ²	++ ³	0	++++	++++	+
Vanguard (cypridonil)	++	+	+	0	0	0
Ziram	+	0	++	+	+++	+

— = Unknown or does not apply; 0 = None; + = Slight; ++ = Fair; +++ = Good; ++++ = Excellent

1. Ratings assume that the fungicide is used at the recommended rate and applied correctly.
2. Except in orchards where resistance is present.
3. Resistance or tolerance is suspected in some orchards but has not been proven.
4. Limited residual activity. Rating assumes regular reapplication during periods of heavy disease pressure.
- 5 Activity of these materials is highly rate-dependent. Stated efficacies assume a rate of 9 fl. ozs./A for Rubigan 1E, 5 ozs./A for Nova 40WP, and 6 ozs./A for Procure 50WS on MM 106-size trees.

* **Adapted from:** 2002 *Pest Management Guidelines for Commercial Tree-Fruit Production*. A.M. Agnello, A.J. Landis, W.W. Turckek, D.A. Rosenberger, T.L. Robinson, J.R. Schupp, L. Cheng, P.D. Curtis, D. Breth, and S.A. Hoying. Cornell Cooperative Extension.

blossoms open when weather conditions favorable for the disease are present or predicted within 24 hours. Must be absorbed by the blossoms to be effective, should not be applied just before or during rain. The frequency of repeat applications depends on weather, blossom opening and disease pressure. Routine use of streptomycin to control shoot blight is not recommended. However, application within 24 hours after the beginning of a hail storm is recommended for fire blight-threatened orchards. Thorough coverage is essential for control. Application of streptomycin at concentration greater than 6X is not recommended.

Restricted entry interval 4 hours. Preharvest interval 50 days.

sulfur: Formulated as wettable powder, flowable, or dust, at 30–98% sulfur. Flowable formulations are effective at lower rates than wettable powder and have better retention. Sulfur is effective against powdery mildew, but has short residual activity and must be used at 7 day interval for good results. Not as effective as captan or EBDCs. Certain sulfur labels prohibit use within 30 days of an oil application, or restrict use within two weeks of a spray containing an emulsifiable concentrate or other petroleum solvent based product. Do not apply with liquid captan on sulfur sensitive cultivars. May cause fruit russetting and/or yield reduction when sprayed postbloom at above 80°F. **Restricted entry interval 24 hours. Preharvest interval 0 days.**

Syllit (dodine): 65% WP. Effective against apple scab: 3/8 lb. 65 WP/100 gals. Also an effective antisporeulant for after-infection scab control when used at 3/4 lb./100 gals. Useful against established scab lesions by suppressing spore germination and production. Do not use on Golden Delicious. Has caused necrotic spotting of McIntosh and Cortland fruit. At the 3/8 lb./100 gals. rate, dodine can be used with oil through the early pink stage. “Buttering-out” can occur in “hard” water or when multiple tanks of spray are applied without rinsing the tank. Prone to foaming. At dosage of more than 1/2 lb./100 gals., dodine may cause injury if applied at freezing or near-freezing temperatures, particularly when accompanied by slow-drying conditions. The 1/2 lb. rate may also cause injury if used with Kelthane WP. Check label for compatibility with other pesticides, EC and F formulations in particular. Apple pomace from dodine-sprayed fruit cannot be used for livestock feed. Not effective against rusts, powdery mildew, fruit rots and most summer diseases.

Caution: Dodine-tolerant strains of the apple scab fungus have been identified in the northeast. Limiting use to one or two applications per season will help prevent resistant scab strain selection. If resistant scab is already present, discontinue Syllit use in that orchard. **Restricted entry interval 48 hours. Preharvest interval 7 days.**

Thiabendazole (Mertect 340-F). Also called TBZ: 16 ozs./100 gals. water. For postharvest dip or spray to control fungi that cause blue mold, grey mold and bull’s eye rot. Postharvest treatment of apples for control of storage rots should not be done except when fruit must be treated for storage scald prevention or have postharvest calcium treatments. Use in combination with captan. Do not treat fruit for more than 3 minutes. Keep the mixture under constant mechanical agitation. Avoid excessive foaming. Toxic to fish, do not dispose of in a way that contaminates bodies of water. **Restricted entry interval of 12 hours.**

Thiram: 75% WDG (1.3–1.7 lbs./100 gals.). Similar effectiveness to sulfur for controlling scab, flyspeck and sooty blotch. Requires more frequent applications than captan. Toxic to fish. Do not contaminate bodies of water with runoff, drift, or rinse water. **Restricted entry interval 24 hours. Preharvest interval 0 days.**

Topsin M (thiophanate-methyl): 70% WP and 70% WSB (4 – 6 ozs./100 gals.). Should be used in combination with a protectant fungicide. For tank

mixes with a protectant fungicide, use Topsin M 70% at 2–3 ozs./100 gals and either: 12-16 ozs. Captan 50 WP; or 7.5 -10 ozs. Captan 80 WP; or 12-16 ozs. Captec 4F/100 gals; or 12-16 ozs. of a mancozeb or maneb 75 DF product; or 1 lb. Ployram; or 1 lb. Ziram 76 DF per 100 gals. Topsin M is similar to Benlate in effectiveness, having locally systemic activity, and has similar resistance concerns. Do not mix with materials containing copper or lime.

Restricted entry interval 12 hours. Preharvest interval 0 days.

Vanguard WG (cyprodinil): 75% WG (1.25 ozs./100 gals. alone, or 0.75 oz./100 gals. in tankmix with the recommended rate of a protectant or systemic fungicide). Vanguard has both surface protectant and systemic postinfection activity. Labeled only for apple scab. Has given good protection when applied on a 7 day schedule. After Tight Cluster, Vanguard should be tankmixed with another protectant because alone it does not protect against fruit scab. Post-infection activity is 48 hours under cool temperatures. Does not have antisporeulant activity. Vigorous agitation is necessary for proper dispersal in tank. Do not apply more than 22 ozs. per acre per season. **Restricted entry interval 12 hours. Preharvest interval 72 days.**

Ziram: 76% DF (1.5- 2 lbs./100 gals.). Considered only to have “slight” activity against scab, but may be useful as a summer fungicide against flyspeck and sooty blotch. For combination with a more effective fungicide, the 1 lb./100 gallons dilute rate can be used. **Do not apply more than 56 lbs./A per crop cycle in the eastern U.S. Restricted entry interval 48 hours. Preharvest interval 14 days.**

