

Eco Apple Protocol Quick Guide V 3.1 – FOR 2007 SEASON – 05/12/07

This guide is designed to make it easier for growers to quickly access information based on apple growth stages. **Other factors remain critically important.** These include scouting and trapping, monitoring weather, and using a season-long approach. **It will not be necessary to take actions at every growth stage.** There may be other products available that are not listed here, and not all products listed here may be available in every state. **FOLLOW YOUR STATE REGULATIONS AND ALL LABEL INSTRUCTIONS.**

STAGE	PEST AND MATERIALS	AMOUNT
Dormant to Silver Tip	Fire blight	
	Copper	
	Kocide 2000 (copper hydroxide)	4 lb. per 100 gal.
	OR C-O-C-S (copper oxychloride)	4 lb. per 100 gal.
	OR Cuprofix Disperss (complexed basic copper sulfate)	6.6 lb per 100 gal.
	OR Champ Flowable (copper hydroxide)	2 qt. per 100 gal.
	OR Bordeaux mix 8-8-100 plus oil	8 lb. copper sulfate 8 lb. spray lime 1 qt oil per 100 gal.
	Early-season copper applications may reduce inoculum of some other diseases.	
Green Tip	Fire blight	
	Although late dormant or silver tip application of copper is preferable, if none one was made it can be made at this time.	
	Apple scab	
	Copper applications offer limited protection against apple scab for 5 to 7 days in those orchards with low inoculum, e.g., without significant scab the previous season. (For accurate determination of inoculum levels, use the Potential Ascospore Dose method in the Fall.) Copper is recommended as the first choice for orchards with low inoculum. See rates for Fire Blight above.	
	In orchards with significant scab the previous season, Vanguard (cyprodinil) OR Syllit (dodine) is recommended as the first choice. (Syllit should not be used where resistance is suspected.) An EBDC fungicide may be used at this time as a second choice. Use at the lower rate label options (Extended Program). Dithane, Manzate and Penncozeb are trade names for the EBDC mancozeb, and virtually the same.	
	Syllit 65 WP	6 oz. per 100 gal.
	OR Vanguard 75 WG	5 oz. per acre
	OR Dithane/Manzate/Penncozeb 75DF/80WP	1 lb. per 100 gal. (up to 3.2 lb/A max)
	OR Polyram 80 DF	1 lb. per 100 gal. (up to 3.2 lb/A max)
	OR Manex 4F.....	0.8 qt. per 100 gal.
Half-inch Green	Apple Scab	
	Options the same as at Green Tip, except DO NOT USE COPPER.	
	Mites, Scale	

Oil.....	2 gal. per 100 gal.
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Tight Cluster

Apple Scab

When using Flint or an SI (Nova, Procure or Rubigan), be aware of resistance management limitations. Do not make back to back applications of Flint. Apply SI's with an EBDC. Do not use SI's two seasons in a row. Do not apply any SI's or Flint more than four times per season as per the Protocol. Do not apply SIs if the orchard has known SI resistance or previous control failure with SIs. Do not use Captan within 10 days of an oil application.

Flint 50WDG 0.67 oz. per 100 gal.

OR A COMBINATION OF EITHER

Nova 40WP..... 2 oz. per 100 gal.

or Procure 50WS..... 4 oz. per 100 gal.

or Rubigan 1EC..... 4 fl. oz. per 100 gal.

PLUS EITHER

Dithane/Manzate/Penncozeb 75DF/80WP 1 lb. per 100 gal. (up to 3.2 lb/A max)

or Polyram 80 DF 1 lb. per 100 gal. (up to 3.2 lb/A max)

or Manex 4F..... 0.8 qt. per 100 gal.

Mites or San Jose Scale

If needed

Oil..... 1 gal. per 100 gal.

OR FOR MITES ONLY

Envidor 2SC (limit one application per season, not avail in NY) 16 – 18 oz. per acre

OR Zeal 72 WDG (for mites only, limit one application per season).... 2 – 18 oz. per acre

OR FOR SCALE ONLY

Esteem 35WP 4 – 5 fl oz per acre

Tarnished plant bug

If over threshold on white rectangle traps

Avaunt 30WDG 5 – 6 oz. per Acre

Pink

Apple Scab

Same as Tight Cluster

Mites

If needed, same as Tight Cluster

Tarnished plant bug

If needed, same as Tight Cluster

Bloom

Apple Scab

Schedule is very similar to Tight Cluster except that Captan may be used alone or in combination with an SI. Do not use Captan within 10 days of an oil application

Captan 50WP..... 2 lb. per 100 gal.

OR Captan 80WP.....	1.25 lb. per 100 gal.
OR Captan 4L.....	1 qt. per 100 gal.
OR Flint 50WG.....	0.8 oz. per 100 gal.

OR A COMBINATION OF EITHER

Nova 40WP.....	2 oz. per 100 gal.
or Procure 50WS.....	4 oz. per 100 gal.
or Rubigan 1EC.....	4 fl. oz. per 100 gal.

PLUS EITHER

Dithane/Manzate/Penncozeb 75DF/80WP.....	1 lb. per 100 gal.
or Polyram 80 DF.....	1 lb. per 100 gal.
or Manex 4F.....	0.8 qt. per 100 gal.
or Captan 50WP.....	1 lb. per 100 gal.
or Captan 80WP.....	0.625 lb. (10 Oz.) per 100 gal.
or Captan 4L.....	1 pt. per 100 gal.

Fire blight

NOTE: Streptomycin must be applied for fire blight only according to a weather-based forecasting program such as Maryblyt or Cougarblight.

BLOSSOM BLIGHT

Streptomycin	
Agrimycin 17WP.....	0.5 lb. per 100 gal.
OR Firewall 17WP.....	0.5 lb. per 100 gal.
OR Streptol 17WP.....	0.5 lb. per 100 gal.

OR A COMBINATION OF

Agrimycin 17WP.....	0.25 lb. per 100 gal.
or Firewall 17WP.....	0.25 pt. per 100 gal.
or Streptol 17WP.....	0.25 pt. per 100 gal.
PLUS Regulaid (spreader/activator).....	1 pt. per 100 gal. actual spray (do not concentrate)

If in 2 – 4 days a second application is needed

Serenade Max.....	12.9 oz per 100 gal.
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If in 2 – 4 days a third application is needed, repeat streptomycin (Agrimycin, Firewall or Streptol, see rates above)

SHOOT BLIGHT (late bloom or early petal fall)

Prohexadione calcium	
Trees > 5 years old	
Apogee 27.5DF*.....	6 oz per 100 gal.
Trees < 5 years old	
Apogee 27.5DF.....	3 oz per 100 gal.

*To be effective, Apogee must be applied well before shoot blight will first appear. Therefore Apogee should be used only if blossom infections are severe or if a history of fire blight in the block the previous year suggests a high risk of shoot blight.

NOTE: After bloom, applications of streptomycin for fire blight must be

made only in the event of hail or high wind damage in orchards with existing infections.

Codling Moth: Pheromones for mating disruption

Isomate CTT	200 ties per acre
OR Checkmate CM-F.....	2.4 - 4.8 fl oz per acre

(Apply pheromone mating disruption before initiation of moth flight (e.g., bloom for first generation, by late June for second generation); border insecticide sprays may be needed in blocks adjacent to sources of adult immigration or other high-pressure situations.)

Obliquebanded Leafroller: If needed, based on >3% infested blossom clusters.

Dipel 10.3DF.....	0.5 – 2.0 lb per acre
OR Agree WG 3.8WS.....	1 – 2 lb per acre
OR Intrepid 2F.....	8 – 16 fl oz per acre

Petal Fall

Apple Scab: Same as Bloom EXCEPT DO NOT USE EBDCs AFTER BLOOM if you use miticides other than oil. Avoiding EBDCs after bloom will preserve predators.

Mites: Make no more than two post-bloom miticide applications per season (except for oil).

Oil (e.g., Stylet-Oil, Omni, PureSpray, Damoil).....	0.5 – 2 gal. per 100 gal.
OR Acramite 50WS (limit one application per season)	12 – 16 oz. per acre
OR Envidor 2SC (limit one application per season, not avail in NY)..	16 – 18 oz. per acre
OR Zeal 72 WDG (limit one application per season)	2 – 18 oz. per acre
OR Kanemite 15SC (limit two applications per season).....	31 fl. oz. per acre

Plum Curculio, European Apple Sawfly: If needed

Avaunt 30WDG	5 – 6 oz. per 100 gal.
OR Calypso 4F.....	1 – 2 oz. per 100 gal.

Note: Sevin applied as a thinner may also have some benefit for Plum Curculio control but must not be applied unless for thinning purposes.

Obliquebanded Leafroller: If needed based on $\geq 3\%$ infested blossom clusters (Only if not treated at bloom.)

Intrepid 2F.....	12-16 fl. oz per acre
OR Proclaim 5SG	0.8 – 1.2 oz per 100 gal
OR Agree WG 3.8WS.....	1 – 2 lb per acre
OR Dipel 10.3DF.....	0.5 – 2 lb per acre

First Cover

Apple Scab: Same as Petal Fall

Plum Curculio: Same as Petal Fall, except after the 1st application for plum curculio, base any additional treatment decisions on scouting for fresh injury and/or a degree-day based oviposition model. After the first application for plum curculio, use perimeter row sprays rather than whole block treatments. *Note: For trees less than 7 ft. in height, or where scouting indicates fresh injury in the interior of a block, full block applications may be made.*

Codling Moth: If needed based on block or region history.

Assail 30 SG 4-8 oz per acre
 (First treatment applied at 250 degree days (base 50) after the first sustained pheromone trap catch (biofix). If pressure is severe as indicated by pheromone traps or fruit damage, an additional application may be made 10-14 days later.)

San Jose Scale: If needed based on block history.

Esteem 35 WP 4 – 5 fl oz per acre
 OR Provado 1.6F..... 2 oz per 100 gal
 (First treatment applied at 500 degree days (base 50) from March 1 and a second applied 14 days later. If pressure is severe as indicated by pheromone traps or fruit damage, an additional treatment against second generation crawlers at 1450 degree days from March 1 (in late July to August) with a second application 14 days later.)

Second Cover

Sooty Blotch and Flyspeck: Do not treat unless need is indicated by previous history and/or weather monitoring for wetting hours. Do not apply fungicides for summer disease until 270 wetting hours have accumulated since petal fall, or if wetting data are not available, early-July may be used as an estimated date.

Flint 50WG 0.67 oz. per 100 gal.
 OR Captan 50WP..... 1 lb. per 100 gal.
 OR Captan 80WP..... 0.625 lb. (10 oz.) per per 100 gal.
 OR Captan 4L 1 pt. per 100 gal.
 OR A COMBINATION OF
 Topsin M 70WP* 3 oz. per 100 gal.
 PLUS EITHER
 Captan 50WP..... 1 lb. per 100 gal.
 or Captan 80WP..... 0.625 lb. (10 oz.) per 100 gal.
 or Captan 4L 1 pt. per 100 gal.

* Use Topsin M only where summer disease pressure is heavy indicated by block history.

Plum Curculio: See First Cover

Codling Moth: See First Cover for insecticide options
 Pheromone disruption (including Oriental Fruit Moth): For best results, make applications before the start of summer generation moth flights

Isomate-M 100 (oriental fruit moth).....
 OR Isomate-C TT (codling moth)..... 100 ties per acre
 OR Isomate-CM/OFM TT (both species)..... 200 ties per acre
 OR Checkmate OFM-F (oriental fruit moth)..... 200 ties per acre
 OR Checkmate CM-F (codling moth)..... 1.3 – 2.9 fl oz per acre
 OR Checkmate CM-OFM Duel (both species)..... 2.4 – 4.8 fl oz per acre
 100 – 150 disp per acre

San Jose Scale: See First Cover.

Third Cover

Sooty Blotch and Flyspeck: After the first application for summer disease (see Second Cover), do not make additional applications closer than intervals listed in Table A below.

Captan 50WP..... 1 lb. per 100 gal.

- OR Captan 80WP..... 0.625 lb. (10 oz.) per 100 gal.
- OR Captan 4L 1 pt. per 100 gal.
- OR A COMBINATION OF
Topsin M 70WP* 3 oz. per 100 gal.
PLUS EITHER
Captan 50WP..... 1 lb. per 100 gal.
or Captan 80WP..... 0.625 lb. (10 oz.) per 100 gal.
or Captan 4L 1 pt. per 100 gal.

*Use Topsin M only where heavy apple scab or summer disease pressure are indicated by scab severity or block history of summer diseases.

Table A. Activity of fungicides against summer diseases

Fungicide	Rate per 100 gal.[JC2]	Minimum interval (days)	Maximum rainfall (in.) during interval
Topsin M <i>plus</i> Captan 50WP	3 oz 1.0 lb	21	2.5
Captan 50WP	1 lb	14	2.0
Flint 50 WDG	0.67 oz.	21	2.5

Adapted from D.A. Rosenberger, Cornell University

Obliquebanded Leafroller: Base application timing on trap catches and DD model (360 DD base 43F after first adult catch)

- Agree WG 3.8WS..... 1 – 2 lb. per acre
- OR Dipel 10.3DF..... 0.5 – 2 lb. per acre
- OR Spintor 2SC..... 2.5 oz per 100 gal
- OR Proclaim 5SG..... 0.8 – 1.2 oz per 100 gal

Follow-up sprays are recommended 10-14 days later to ensure contacting most larvae of the 1st summer generation.

After Third Cover

Sooty Blotch and Flyspeck: Same as Third Cover except that a third summer disease application may be made only as per Table A above.

Apple Maggot: Base applications on monitoring traps (threshold of ≥ 1 for unbaited spheres or ≥ 5 for baited spheres) or use trap-out spheres

- Assail 30SG..... 8 oz per acre
- OR Avaunt 30WDG 5 – 6 oz. per acre
- OR Spintor 2SC 2.5 oz. per 100 gal.
- OR Surround WP [Frequent applications (7-10-day intervals) and maximal coverage (minimum of 100 gal/A are advised while there is active foliar growth)]..... 25 – 50 lb per acre

Codling Moth and Oriental Fruit Moth: Base applications on trap catch (1st adult flight biofix) and DD developmental models (CM: 250 DD base 50F from biofix; OFM: 170 DD base 43F from biofix), plus follow-up application 10-14 days later for each brood

follow-up application 10-14 days later for each brood.

Assail 30SG.....	8 oz per acre
OR Avaunt 30WDG	5 – 6 oz per acre
OR Intrepid 2F.....	12 – 16 oz per acre
OR Carpovirusine 0.99SC (for codling moth only).....	0.5 – 1 pt per 100 gal
OR Cyd-X 0.06SC (for codling moth only).....	3 fl oz per acre

Mites: Make no more than two post-bloom miticide applications per season.

Acramite 50WS (limited to 1 application per season).....	0.75 – 1 lb per acre
OR Envidor 2 SC (limit one application per season)	16 – 18 oz per acre
OR Kanemite 15SC (limited to 2 applications per season).....	31 fl oz per acre
OR Zeal 72WS (limited to 1 application per season).....	2 – 3 oz per acre

White Apple Leafhopper:

Assail 30SG.....	2.5 – 4 oz per acre
OR Avaunt 30WDG.....	5 – 6 oz per acre
OR Provado 1.6F.....	0.5 – 2 oz per 100 gal

Woolly Apple Aphid:

Assail 30SG.....	4 – 8 oz per acre
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