

DRAFT Eco Apple Protocol Quick Guide V 7.5 – FOR 2011 SEASON – 04/07/2011

This guide is designed 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 THE ECO APPLE PROTOCOL, YOUR STATE REGULATIONS AND ALL LABEL DIRECTIONS.**

CHANGES FOR 2011

- Brown Marmorated Stink Bug (BMSB) management guidelines, pg. 9-10.
- Rubigan renamed as Vintage, pg. 2.
- Prophyte 4.2L added for sooty blotch and flyspeck management, pg. 6.
- Changes to Table A. Activity of fungicides against summer diseases, pg. 8.

STAGE	PEST AND MATERIALS	AMOUNT
Dormant to Silver Tip	<p>Fire blight Copper</p> <p>Kocide 2000 (copper hydroxide).....</p> <p>OR C-O-C-S (copper oxochloride)</p> <p>OR Cuprofix Disperss (complexed basic copper sulfate)</p> <p>OR Champ Flowable (copper hydroxide).....</p> <p>OR Bordeaux mix 8-8-100 plus oil</p> <p>Early-season copper may reduce inoculum of some other diseases. Maximum of two copper applications per season.</p>	<p>4 lb. per 100 gal.</p> <p>4 lb. per 100 gal.</p> <p>6.6 lb per 100 gal.</p> <p>2 qt. per 100 gal.</p> <p>8 lb. copper sulfate</p> <p>8 lb. spray lime</p> <p>1 qt oil per 100 gal.</p>
Green Tip	<p>Fire blight Although late dormant or silver tip application of copper is preferable, if none was made it can be made at this time.</p> <p>Apple scab Copper offers limited protection from apple scab for 5 to 7 days in orchards with low inoculum, e.g., without significant scab the previous season. (For accurate determination of inoculum, use the Potential Ascospore Dose method in the Fall.) Copper is the first choice for orchards with low inoculum. See rates for Fire Blight above.</p> <p>In orchards with significant scab the previous season, Vanguard (cyprodinil) OR Syllit (dodine) is suggested as the first choice. Syllit should not be used where resistance is suspected. Captan or an EBDC 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. Captan is preferable to an EBDC but do not use Captan within 10 days of an oil application.</p> <p>The use of Captan and Mancozeb or Captan and Flint tank-mixes is permitted.</p>	

	<p>(Apple scab continued)</p> <p>Syllit 65 WP 6 oz per 100 gal.</p> <p>OR Vanguard 75 WG 5 oz per acre</p> <p>OR Captan 50WP 2 lb. per 100 gal.</p> <p>OR Captan 80WP 1.25 lb. per 100 gal.</p> <p>OR Captan 4L 1 qt. per 100 gal.</p> <p>Note: Do not use Captan within 10 days of an oil application.</p> <p>OR Dithane/Maneb/Penncozeb 75DF/80WP 1 lb. per 100 gal. (up to 3.2 lb/A max)</p> <p>OR Polyram 80 DF 1 lb. per 100 gal. (up to 3.2 lb/A max)</p>	
Half-inch Green	<p>Apple scab Options the same as at Green Tip, except DO NOT USE COPPER.</p> <p>Mites, Scale Oil 2 gal. per 100 gal.</p> <p>Rosy Apple Aphid (timing is critical for effective control) Esteem 35 WP 3-5 oz per acre</p>	
Tight Cluster	<p>Apple scab When using Flint or an SI (Indar, Rally, Procure or Vintage), be aware of resistance management limitations. Do not make back to back applications of Flint. Apply SI's with an EBDC or Captan. SI's may be applied 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 use Captan within 10 days of an oil application. Back to back applications of Inspire Super MP are permitted and not to exceed two.</p> <p>Flint 50WDG 0.67 oz per 100 gal.</p> <p>OR A COMBINATION OF EITHER</p> <p>Rally 40WSP 2 oz per 100 gal.</p> <p>or Indar 2F 6 - 8 oz per acre</p> <p>or Procure 50WS 4 oz per 100 gal.</p> <p>or Rubigan 1EC 4 fl. oz per 100 gal.</p> <p>or Inspire Super MP 8 oz per acre (4 oz Inspire + 4 oz Vanguard)</p> <p>PLUS EITHER</p> <p>Dithane/Maneb/Penncozeb 75DF/80WP 1 lb. per 100 gal. (up to 3.2 lb/A max)</p> <p>or Polyram 80 DF 1 lb. per 100 gal. (up to 3.2 lb/A max)</p> <p>Mites or San Jose Scale If needed Oil 1 gal. per 100 gal.</p> <p>OR FOR MITES ONLY IF OIL IS NOT USED</p> <p>Envidor 2SC (limit one application per season, not avail in NY) 16 – 18 oz per acre</p> <p>OR Zeal 72 WDG (for mites only, limit one application per season) .. 2 – 3 oz per acre</p> <p>OR Portal/Fujimite (for mites only, limit one application per season) 1 – 2 pt per acre</p> <p>OR FOR SCALE ONLY</p> <p>Esteem 35WP 4 – 5 fl oz per acre</p>	

	<p>Tarnished plant bug If over threshold on white rectangle traps Avaunt 30WDG</p> <p>Rosy apple aphid Actara 25 WDG (Do not apply within 4 days of bloom)</p>	<p>5 – 6 oz per acre</p> <p>4.5 fl. oz per acre</p>
Pink	<p>Apple scab Same as Tight Cluster</p> <p>Mites If needed, same as Tight Cluster (excluding oil, which can damage blossom buds)</p> <p>Tarnished plant bug If over threshold on white rectangle traps, same as Tight Cluster</p>	
Bloom	<p>Apple scab Captan 50WP..... OR Captan 80WP..... OR Captan 4L</p> <p>OR FLINT 50WG.....</p> <p>OR A COMBINATION OF EITHER Rally 40WSP..... or Indar 2F</p> <p>or Procure 50WS..... or Rubigan 1EC..... or Inspire Super MP</p> <p>PLUS EITHER Dithane/Manzate/Penncozebe 75DF/80WP</p> <p>or Polyram 80 DF</p> <p>or Manex 4F..... or Captan 50WP..... or Captan 80WP.....</p> <p>or Captan 4L</p> <p>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</p> <p>OR Firewall 17WP.....</p> <p>OR A COMBINATION OF Agrimycin 17WP</p> <p>or Firewall 17WP..... PLUS Regulaid (spreader/activator).....</p>	<p>2 lb. per 100 gal. 1.25 lb. per 100 gal. 1 qt. per 100 gal. 0.8 oz per 100 gal.</p> <p>2 oz per 100 gal. 6 - 8 oz per acre 4 oz per 100 gal. 4 fl. oz per 100 gal. 8 oz per acre (4 oz Inspire + 4 oz Vanguard tank-mix)</p> <p>1 lb. per 100 gal. 1 lb. per 100 gal. 0.8 qt. per 100 gal. 1 lb. per 100 gal. 0.625 lb. (10 Oz.) per 100 gal. 1 pt. per 100 gal.</p> <p>0.5 lb. per 100 gal. 0.5 lb. per 100 gal.</p> <p>0.25 lb. per 100 gal. 0.25 pt. per 100 gal. 1 pt. per 100 gal. actual</p>

	<p>If in 2 – 4 days a second application is needed Serenade Max</p> <p>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) Trees > 5 years old Apogee 27.5DF*</p> <p>Trees < 5 years old Apogee 27.5DF.....</p> <p>*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.</p> <p>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.</p>	<p>spray (do not concentrate)</p> <p>12.9 oz per 100 gal.</p> <p>6 oz per 100 gal.</p> <p>3 oz per 100 gal.</p>
	<p>Codling moth: Pheromones for mating disruption Isomate CTT</p> <p>OR Checkmate CM-F.....</p> <p>Apply pheromone mating disruption before initiation of moth flight (e.g., bloom for first generation, by late June for second generation); supplemental insecticide sprays timed to coincide with egg hatch will likely also be needed and may include border sprays in blocks adjacent to sources of adult immigration or other high-pressure situations.</p> <p>Obliquebanded leafroller: If needed, based on >3% infested blossom clusters. Dipel 10.3DF.....</p> <p>OR Agree WG 3.8WS.....</p> <p>OR Intrepid 2F.....</p>	<p>200 ties per acre 2.4 - 4.8 fl oz per acre</p> <p>0.5 – 2.0 lb per acre 1 – 2 lb per acre 8 – 16 fl oz per acre</p>
<p>Petal Fall</p>	<p>Apple scab: Same as bloom, additionally, applications of EBDC's are allowed through petal fall. However it is recommended not to use EBDC's after bloom if you use miticides other than oil. Avoiding EBDC's after bloom will preserve predators. Use of Inspire Super MP may continue up to two weeks after petal-fall.</p> <p>Mites: Make no more than two post-bloom miticide applications per season (except for oil). Oil (e.g., Stylet-Oil, Omni, PureSpray, Damoil)</p> <p>OR Envidor 2SC (limit one application per season, not avail in NY) OR Zeal 72 WDG (limit one application per season)</p> <p>OR Acramite 50WS (limit one application per season)</p> <p>OR Kanemite 15SC (limit two applications per season).....</p> <p>(Acramite and Kanemite are effective adulticides and thus may be</p>	<p>0.5 – 2 gal. per 100 gal. 16 – 18 oz per acre 2 – 18 oz per acre 31 fl. oz per acre 12 – 16 oz per acre</p>

	<p>best reserved for later in the season) OR Portal/Fujimite (for mites only, limit one application per season)</p> <p>Plum curculio, European apple sawfly: If needed Avaunt 30WDG OR Calypso 4F..... Actara 25WDG (do not apply within four days of bloom) Note: Sevin applied as a thinner may also have some benefit for Plum Curculio control but must not be applied unless for thinning purposes.</p> <p>Obliquebanded leafroller: If needed based on $\geq 3\%$ infested blossom clusters (Only if not treated at bloom.) Altacor 35WDG OR Delegate 25WG OR Belt 480SC</p> <p>(For these three products, make no more than three applications per product per season. Use for one generation of the target pest only.)</p> <p>OR Proclaim 5SG OR Intrepid 2F OR Agree WG 3.8WS..... OR Dipel 10.3DF.....</p> <p>Rosy apple aphid Provado 1.6 Flowable OR Assail 30SG..... OR Calypso</p>	<p>1 – 2 pt per acre</p> <p>5 – 6 oz per acre 6 - 8 oz per acre 4.5-5.5 oz per acre</p> <p>2.5-4.5 oz per acre 4.5-7.0 oz per acre 3.0-5.0 oz per acre</p> <p>3.2 – 4.8 oz per acre 12-16 fl. oz per acre 1 – 2 lb per acre 0.5 – 2 lb per acre</p> <p>8.0 fl. oz per acre 4.0 – 6.0 oz per acre 4.0 – 6.0 oz per acre</p>
<p>First Cover</p>	<p>Apple scab: Same as Petal Fall, except EBDC's CANNOT BE USED.</p> <p>Brown Marmorated Stink Bug See management guidelines on pages 9-10 for 'High-risk' and 'Moderate-risk' blocks.</p> <p>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. <i>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.</i></p> <p>Codling moth: If needed based on block or region history. Altacor 35WDG OR Delegate 25WG OR Belt 480SC</p> <p>For these three products, apply first treatments just prior to egg hatch (250 degree days, base 50, after the first sustained pheromone trap catch (biofix)) followed by a second at 10-14-day interval. For these three products, make no more than three applications per product per season. Use for one generation of the target pest only, e.g., use an alternative material for the other codling moth generation.</p> <p>OR Assail 30SG.....</p>	<p>2.5 - 4.5 oz per acre 4.5 - 7.0 oz per acre 3 - 5 oz per acre</p> <p>6 – 8 oz per acre</p>

	<p>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.</p> <p>OR Carpovirusine 0.99SC (for codling moth only).....</p> <p>OR Cyd-X 0.06SC (for codling moth only).....</p> <p>These two products contain granulosis virus which specifically attacks codling moth larvae and work well in combination with mating disruption. They must be applied starting at first egg hatch and every 7-8 days during the moth flight, or about 4 applications per generation. Multiple applications at low rates are preferred.</p> <p>San Jose scale: If needed based on block history. Make first application at 500 degree days (base 50) from March 1 and a second 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.</p> <p>Esteem 35WP</p> <p>OR Movento 2SC.....</p> <p>(Maximum of 25 oz of Movento per season.)</p> <p>OR Provado 1.6F.....</p>	<p>0.5 – 1 pt per acre 3 fl oz per acre</p> <p>4 – 5 fl oz per acre 6 - 9 oz per acre</p> <p>6 – 8 oz per acre</p>
<p>Second Cover</p>	<p>Brown Marmorated Stink Bug See management guidelines on pages 9-10 for 'High-risk' and 'Moderate-risk' blocks.</p> <p>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.</p> <p>Flint 50WG.....</p> <p>OR Captan 50WP.....</p> <p>OR Captan 80WP.....</p> <p>OR Captec OR Captan 4L.....</p> <p>OR A COMBINATION OF Topsin M 70WP OR Topsin M 70WDG OR T-Methyl 70W*</p> <p>OR T-Methyl 4.5F*</p> <p>OR ProPhyte 4.2L.....</p> <p>PLUS EITHER Captan 50WP.....</p> <p>or Captan 80WP.....</p> <p>or Captan 4L</p> <p>* NOTE: Use Topsin M or T-Methyl only where summer disease pressure is heavy indicated by block history. Use no more than 4 lb. per acre per year.</p>	<p>0.67 oz per 100 gal. 1 lb. per 100 gal. 0.625 lb. (10 oz) per per 100 gal. 1 pt. per 100 gal.</p> <p>4 oz per 100 gal. 3 oz per 100 gal. 16 fl. oz. per 100 gal.</p> <p>1 lb. per 100 gal. 0.625 lb. (10 oz) per 100 gal. 1 pt. per 100 gal.</p>

	<p>Plum curculio: See First Cover</p> <p>Codling moth/Oriental fruit 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</p> <p>Isomate-M 100 (oriental fruit moth)..... 100 ties per acre OR Isomate-C TT (codling moth)..... 200 ties per acre OR Isomate-CM/OFM TT (both species)..... 200 ties per acre OR Checkmate OFM-F (oriental fruit moth)..... 1.3 – 2.9 fl oz per acre OR Checkmate CM-F (codling moth)..... 2.4 – 4.8 fl oz per acre OR Checkmate CM-OFM Duel (both species)..... 150–175 disp per acre</p> <p>Japanese beetle Assail 30SG..... 5 - 8 oz per acre OR Provado 1.6F..... 8 fl. oz per acre</p> <p>Multiple applications may be needed. Spot treatments should be considered where activity is limited within the orchard. Applications limited to the top of the canopy where feeding is occurring may be effective. Sample to determine if broad spectrum insecticides (Assail, Avaunt, Calypso) applied for other pests, e.g., apple maggot, codling moth, reduce or eliminate the need to apply an insecticide for Japanese beetle.</p> <p>San Jose scale: See First Cover.</p>									
<p>Third Cover</p>	<p>Brown Marmorated Stink Bug See management guidelines on pages 9-10 for 'High-risk' and 'Moderate-risk' blocks.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>*Use Topsin M only where heavy apple scab or summer disease pressure are indicated by scab severity or block history of summer diseases.</p> <p>Table A. Activity of fungicides against summer diseases</p> <table border="1" data-bbox="277 1818 1182 1906"> <thead> <tr> <th>Fungicide</th> <th>Rate per 100 gal.</th> <th>Minimum interval (days)</th> <th>Maximum rainfall (in.) during interval</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Fungicide	Rate per 100 gal.	Minimum interval (days)	Maximum rainfall (in.) during interval					
Fungicide	Rate per 100 gal.	Minimum interval (days)	Maximum rainfall (in.) during interval							

Captan 50 WP <i>plus</i> Topsin M OR ProPhyte 4.2L	1.0 lb 3 oz 16 fl oz	21	2.0
Captan 50WP	1 lb	14	1.5
Flint 50 WDG	0.67 oz	21	2.0

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.....
- OR Altacor 35WDG.....
- OR Delegate 25WG.....
- OR Belt 480SC.....

(For these three products, make no more than three applications per product per season. Use for one generation of the target pest only.)

- OR Dipel 10.3DF.....
- OR Spintor 2SC.....
- OR Proclaim 5SG.....

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

1 – 2 lb. per acre
2.5 - 4.5 oz per acre
4.5 - 7.0 oz per acre
3 - 5 oz per acre

0.5 – 2 lb. per acre
7 – 8 oz per acre
3.2 – 4.8 oz per acre

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.

Summer and storage diseases: Use as final fungicide pre-harvest.

- Pristine

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.....
- OR Calypso 4F.....
- OR Avaunt 30WDG.....
- 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)].....

Brown Marmorated Stink Bug

See management guidelines on pages 9-10 for 'High-risk' and 'Moderate-risk' blocks.

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 45F from biofix), plus follow-up application 10-14 days later for each brood.

- Altacor 35 WDG.....
- OR Delegate 25WG.....
- OR Belt 480SC.....

(Note: These three products are limited to no more than three applications per product per season. Use for one generation of the

14.5 to 18.5 oz per acre

8 oz per acre
4 – 8 oz per acre
5 – 6 oz per acre

25 – 50 lb per acre

2.5 - 4.5 oz per acre
4.5 - 7.0 oz per acre
3 - 5 oz per acre

	target pest only.) OR Assail 30SG..... OR Avaunt 30WDG..... OR Intrepid 2F..... OR Carpovirusine 0.99SC (for codling moth only)..... OR Cyd-X 0.06SC (for codling moth only)..... Mites: Make no more than two post-bloom miticide applications per season. Acramite 50WS (limited to 1 application per season) OR Envidor 2 SC (limit one application per season) OR Kanemite 15SC (limited to 2 applications per season) OR Zeal 72WS (limited to 1 application per season) OR Portal/Fujimite (for mites only, limit one application per season) White apple leafhopper: Assail 30SG..... OR Avaunt 30WDG..... OR Provado 1.6F..... Woolly apple aphid: Assail 30SG..... OR Movento..... (Apply Movento early if over threshold, not effective against established high populations.)	8 oz per acre 5 – 6 oz per acre 12 – 16 oz per acre 0.5 – 1 pt per acre 3 fl oz per acre 0.75 – 1 lb per acre 16 – 18 oz per acre 31 fl oz per acre 2 – 3 oz per acre 1 – 2 pt per acre 2.5 – 4 oz per acre 5 – 6 oz per acre 2.0 – 4.0 oz per acre 4 – 8 oz per acre 6 – 9 oz per acre
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ADDITIONAL NOTES: If lesser appleworm is a problem indicated by block history or monitoring, Delegate or Belt may be applied just prior to egg hatch followed by a second 10-14 days later. Any codling moth applications are also likely to control lesser appleworm, thus in orchards treating for codling moth, applications specifically for lesser appleworm are not likely to be needed.

STAGE	PEST AND MATERIALS	AMOUNT
At or after Third Cover	BMSB moderate-risk blocks: No history of BMSB damage but confirmed BMSB feeding injury to fruit at or after third cover likely to result in economic losses greater than the cost of control. Additional applications must be based on continued BMSB feeding injury determined by scouting.	
	*Actara + Surround (thiamethoxam + kaolin) Actara (thiamethoxam).....	5.5 oz/acre
	Plus Surround WP (kaolin)..... Note: Kaolin recommended to increase efficacy.	25 to 50 lb/acre
	For early-season varieties **Belay (clothianidin).....	6 to 12 fl oz/acre
	OR **Clutch (clothianidin).....	3 to 6 oz/acre
	For late-season varieties OR *Thionex 50W (endosulfan).....	2 lb per acre

