

eco
applesTM
BORN AND RAISED HERETM

Eco Apple Protocol and Grower Self-Assessment

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For 2009 Growing Season – Version 5.2 – 04/03/09

See page 27 for list of revisions to this edition.

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THE ECO APPLE PROJECT

In partnership with farmers, scientists and other agricultural professionals, Red Tomato has developed this protocol to achieve measurable reductions in the use of high toxicity pesticides. Through our work, we hope to contribute to a bountiful supply of quality, local foods with minimal pesticide residues, and to improve our soil and water resources, wildlife biodiversity, farm worker safety, farm stability and farmland preservation in the Northeastern USA.

Our protocol is based on a reduced-risk program developed by researchers, consultants and growers, and generally follows guidelines for Integrated Production by the International Organization for Biological and Integrated Control and Noxious Animals and Plants (IOBC).

Practices contained in this protocol are considerably more expensive than conventional programs that rely on highly toxic pesticides. Our project works to incorporate economic incentives for farmers to adopt reduced-risk methods. We recognize that reducing toxicity is an ongoing process. Our goal is to improve continuously as we learn more about reduced-risk alternatives and what it takes to implement them *and* grow high quality apples.

Red Tomato is a nonprofit organization that helps family farmers survive and thrive by connecting them to customers who want high-quality produce, by developing new markets and managing all the logistics and promotion needed to ensure success in a supermarket environment, and educating trade buyers and consumers to appreciate and seek out products that are ecologically grown by family farmers.

Roles and Procedures

Red Tomato is the lead organization. Decisions on the protocol, procedures and market approach will be made in concert with researchers, crop consultants, growers and others. The IPM Institute of North America, an independent non-profit organization, will maintain the protocol with advice from the project partners. The Institute will also coordinate inspection by independent, third-party IPM professionals, review materials submitted by growers and inspectors, and make final determination on certification approvals. To apply for and maintain certification, the following steps will be followed:

1. All growers complete this Self-Assessment and submit to the IPM Institute with required pesticide application records and fees by August 1. For first year growers, the Institute will appoint an inspector to verify the information provided during an on-site audit to be scheduled prior to marketing certified fruit and every third year thereafter. All minimum requirements must be in place (Section I), and the required minimum score must be earned on optional practices (Section II).
2. Each year thereafter, participating growers will update and submit this Self-Assessment along with the certification fee and scouting and pesticide, fertilizer, thinner and growth regulator application records to the Institute by August 1. If these are not received by August 1, the Institute will appoint an inspector to conduct a site visit for additional cost.
3. Application records must include at least the date of application, block(s), acreage, trade name and formulation of material applied (with EPA registration number and target pest for pesticides) and rate per acre (oz., gals. or lbs./acre). Cost per unit (lb., gallon) for each pesticide used must also be included. Scouting records must include date, block(s), pest and result, e.g., captures per trap, mites per leaf, etc.
4. Annually, Red Tomato and its partners will review and evaluate the project and make adjustments as needed to continue to achieve our goals. The IPM Institute will update the protocol and certification procedures as needed. This review will be very important to address changes in product availability and pests, and improve our performance.

ECO-APPLE SELF-EVALUATION COVER SHEET

Grower Name: _____

Business Name: _____

Physical address: _____

Phone: () _____ Fax: () _____

Cell Phone: () _____

Email address: _____

Website: _____

Orchard Block List. List orchard blocks covered by this self-assessment below. Blocks with the same management practices (that will earn same scores throughout this assessment) can be grouped together as one block. Attach additional pages if needed to list all blocks.

Important: If differences in the way individual blocks are managed impacts a response on this self-assessment, they should be listed as separate blocks. For example, if apple maggot is controlled by trapping in only one block, list and score that block as a separate block.

1. Block name(s): _____

cultivar(s): _____

acres and estimated annual production (bu.): _____

2. Block name(s): _____

cultivar(s): _____

acres and estimated annual production (bu.): _____

3. Block name(s): _____

cultivar(s): _____

acres and estimated annual production (bu.): _____

4. Block name (s): _____

cultivars: _____

acres and estimated annual production (bu.): _____

5. Block name (s): _____

cultivars: _____

acres and estimated annual production (bu.): _____

I. Minimum Requirements – Enter Pass (P), Fail (F) or Not Applicable (NA) in the column provided for each block or group of blocks listed on the preceding page.

Grower must implement all of the following. Items rated as F must be addressed before certification is approved. Explain any F or NA scores. Attach additional pages as needed.

Provision for Emergencies: If an emergency situation arises during the growing season where you feel that a pest problem cannot be managed without violating the protocol, contact the IPM Institute immediately. An expert panel of project scientists will assess the problem and options, and determine if an exception to the protocol is justified.

<i>Enter P, F or NA for each block in the columns to the right</i>	<i>Block Number</i>				
	1	2	3	4	5
1. Grower meets legal requirements					
a. Pesticides used are legally available for the use and application rate.					
b. Applicators hold required licenses and certification.					
c. Pesticide storage meets legal requirements.					
d. Used pesticide container disposal and recycling meets legal requirements.					
e. Required pre-harvest intervals are observed.					
f. Worker housing meets legal requirements.					
g. Pesticide application records meet legal requirements.					
<i>Worker Protection Standard-related legal requirements:</i>					
h. Central posting includes safety poster, emergency contacts, pesticide information.					
i. Pesticide safety training is provided for workers.					
j. Decontamination equipment and supplies are available.					
k. Personal protective equipment is available to all workers and used according to requirements on pesticide label.					
l. Application notification and postings are made, including posting and observation of required re-entry times.					

Notes – Explain any F or N/A scores:

<i>Enter P, F or NA for each block in the columns to the right</i>	Block Number				
2. Soil and Water Conservation	1	2	3	4	5
a. Soil and foliar analysis are conducted at least every three years to determine available nutrients.					
b. Results from soil and/or foliar analysis are used to calculate nutrient application rates, to minimize nutrient use and limit potential for nutrient pollution.					
c. Nitrogen applications are made only between bud break and July 1 with the exception of post-harvest urea applications made to leaf litter between leaf fall and bud break for scab management.					
d. If total actual nitrogen application rate exceeds 50 lbs./acre, two applications of less than 50 lbs. each are made at least one week apart to minimize runoff risk.					
e. Soil pH is tested at least every three years and maintained between 6 and 7.					
f. The most recent soil/foilage test results are available for inspection.					
g. Nutrient application records for the past 12 months are available for inspection.					
h. Row middles (drive rows) are sod or mulch-covered year round.					
i. Visibly eroded areas are not present and immediately corrected if they occur.					
j. A vegetated buffer separates surface water from managed apple trees by at least 50 ft., or larger where required by the pesticide labels for materials applied.					

Notes – Explain any F or N/A scores:

<i>Enter P, F or NA for each block in the columns to the right</i>	Block Number				
3. Pesticide Use and Hazard Reduction					
3A. General practices	1	2	3	4	5
a. Trees are well pruned to allow penetration of light, air and spray material.					
b. Prunings are destroyed or removed such that no residue remains after one year.					
c. Summer pruning is used on vigorously growing semi-dwarf or standard-sized trees. Exceptions may be made for fire blight susceptible varieties.					
d. Tree row volume is used to configure spray pattern and calculate rates. (Any mandatory minimum applications rates specified on the product label must be met.)					
e. Pesticide application equipment is calibrated at least annually.					
f. Records from the most recent calibration are available for inspection.					
g. Pesticides no longer used (e.g., no longer registered for use) are returned to dealer or disposed of at the next collection. While in storage, obsolete pesticides are clearly marked and separated from pesticides in current use.					
h. Grower has access to current wind speeds (e.g., hand-held monitor, weather station, Skybit) and uses this information to reduce potential for drift. Label requirements referencing maximum wind speeds are followed.					
i. Prohibited pesticides (see Section III. Do Not Use list) are not used.					
j. Scouting records for the current and previous season are available for inspection.					

Notes – Explain any F or N/A scores:

Enter P, F or NA for each block in the columns to the right	Block Number				
3B. Pest-Specific Practices					
<p>Note: Systematic sampling or monitoring requires following a standard and ideally written procedure, e.g., sampling a pre-determined number of leaves and trees in each block for mites, and where available, using a quantitative threshold to determine need to treat. The procedure should be one recommended by Extension where available and may be reasonably modified by grower and/or crop advisor experience. Modifications may include adjustments for weather conditions, or practicality of implementing the procedure and responding to results in the given orchard or block. Explain variance from Extension recommendations or protocol specifications in notes.</p>					
Apple scab	1	2	3	4	5
a. Fungicides for scab cease within two weeks after primary scab season (as per Extension communications) unless visible infections are found during scouting.					
Mites					
a. Post-bloom miticides are applied only after both mites and mite predators have been systematically sampled in each block and predators are insufficient to provide control. Systematic sampling includes viewing a pre-determined number of leaves and trees in each block for and using a quantitative threshold for determining need to treat such as those found in the New England Tree Fruit Management Guide, the Cornell Pest Management Guidelines for Commercial Tree Fruit Production, Pennsylvania Tree Fruit Production Guide.					
b. No more than two post-bloom applications of miticide are made per season.					
Tarnished plant bug					
a. Orchard blocks are not treated for tarnished plant bug unless captures on white sticky traps are over threshold in each block treated. Place traps no later than silver tip and use one trap per three to five acres and at least five traps per block. Suggested thresholds include a cumulative average by tight cluster of three per trap (for apples destined for the wholesale market) or five per trap (for retail markets where dimpled fruit are less of a concern); and five per trap (wholesale) or eight per trap (retail) at late pink. Note: Research results to date suggest cost of control is not justified because feeding damage does not substantially affect fruit grade and/or current control options are not very effective. Growers are requested to consider leaving some trees untreated in blocks over threshold to assess extent of economic damage.					
Fire Blight					
a. Streptomycin is only applied for fire blight according to a weather-based forecasting program such as Maryblyt or Cougarblight.					
b. Post-bloom applications of streptomycin for fire blight are made only in the event of hail or high wind damage in orchards with existing infections.					

Enter P, F or NA for each block in the columns to the right	Block Number				
3B. Pest-Specific Practices (continued)					
Plum curculio	1	2	3	4	5
a. After the first application of pesticide for plum curculio at or after petal fall, further treatment decisions are based on sampling fruit for any sign of fresh injury, fruit diameter reaching 6-7 mm and/or a degree-day-based oviposition model.					
b. Second (and third if necessary) pesticide applications for plum curculio are perimeter row sprays rather than whole block treatments. <i>You may score as NA for blocks with trees less than 7 ft. in height, or where scouting indicates fresh injury in the interior of a block (i.e., where full block applications may be needed).</i>					
Codling Moth					
a. Codling moth is not treated unless need is indicated by block or region history of economic injury or by monitoring using pheromone traps or sampling for damage. NOTE: No pheromone trap capture threshold has been definitively established for the Northeast. Captures and thresholds vary depending on trap density, lure type and whether or not mating disruption is in use. Four to five codling moths/trap/week is used in some other regions including the North Central Region (after an insecticide application, new trap captures are not counted towards the threshold until the eighth day after the application). <i>Score as NA if no block or region history of economic injury due to codling moth.</i>					
b. If codling moth is treated, degree-days are used to calculate treatment timing with the first treatment applied at 250 degree days (base 50) after the first sustained pheromone trap catch (biofix) of each generation. If pressure is severe as indicated by pheromone traps or fruit damage, additional applications may be made 10-14 days after these applications. <i>Score as NA if no treatments are made for codling moth.</i>					
Obliquebanded Leafroller					
a. Obliquebanded leafroller is not treated unless need is indicated by systematic sampling for infested clusters or terminals (e.g., 3% infested using the sampling procedure described in the Cornell Guide for Pest Management of Tree Fruit). <i>Score as NA if there is no block or region history of economic injury due to obliquebanded leafroller.</i>					
b. If obliquebanded leafroller is treated, no more than one application is used against the overwintering generation (bloom or petal fall). Two applications may be used against second generation. Use degree days to calculate treatment timing with the first treatment applied at 360 degree days (base 43F) after the first pheromone trap catch (biofix) and a second applied 10-14 days later. <i>Score as NA if no treatments are made for obliquebanded leafroller.</i>					

Notes – Explain any F or N/A scores:

Enter P, F or NA for each block in the columns to the right				Block Number				
Summer diseases: Sooty blotch, fly speck								
a. Fungicides are not applied for summer disease until 270 accumulated wetting hours from petal fall (any early infections will be controlled by scab fungicides). If wetting data are not available, early-July may be used as an estimated date. Thereafter, fungicides should be applied at intervals no closer than those listed in Table A.								
Table A. Activity of fungicides against summer diseases								
Fungicide	Rate per 100 gal. at 300 gals. per acre.	Minimum interval (days)	Maximum rainfall (in.) during interval					
Topsin M plus Captan 50W	3 oz 1.0 lb	21	2.5					
Captan 50W	1 lb.	14	2.0					
Flint 50 WDG	0.67 oz.	21	2.5					
Adapted from D.A. Rosenberger, Cornell University								
Apple maggot								
a. Treatment decisions for apple maggot are based on monitoring with three or more sticky traps placed in each block and a threshold of ≥ 1 per trap if using unbaited traps, or ≥ 5 per trap if using odor-baited traps. Use more traps per acre in small blocks and other blocks with lengthy perimeters vs. area. After treatment, wait 10 days, remove all captures from traps, and then begin counting captures towards the threshold.								
Post-harvest diseases and disorders								
a. Post-harvest fungicides are used only if fruit are dipped prior to storage, e.g., DPA is used.								
b. DPA is used only on susceptible varieties destined for CA storage.								
Rodents/voles								
a. If grain-based rodenticides (corn, oats) are used, they are applied in bait stations or burrows only.								

Notes – Explain any F or N/A scores:

4. Grower Education and Self-Improvement	P/F
a. Grower has attended educational meetings within the last year. List at least one:	
b. Grower plans the following improvement(s) over the next three years. List at least one:	

Notes – Explain any F or N/A scores:

<i>Enter P, F or NA for each block in the columns to the right</i>	<i>Block Number</i>				
5. Food Safety and Product Quality					
a. Clean toilet and hand-washing facilities are available to field, harvest and packing house staff.	1	2	3	4	5
b. Livestock are not allowed in bearing orchards.					
c. Manure is not applied to bearing orchards.					
d. Only fruit of sound internal quality are sold as Eco-Apple label.					
e. Travel ways between trees and packinghouse/storage are smoothed prior to harvest.					
f. Fruit is harvested at correct maturity according to starch iodine, firmness or other accepted measures.					
g. Fruit bins and boxes are sound and clean of soil, plant or animal debris prior to use.					
h. Fruit that has fallen to the ground (drops) are not sold as Eco-Apples.					
i. Filled harvest containers are transported immediately to packing and storage.					

Notes – Explain any F or NA scores:

II. Scored advanced practices. Enter points indicated under the appropriate block number if practice is implemented in that block or group of blocks. A minimum score of 20 points is required on this section for each block. Make note of any advanced practices implemented that are not listed here.

	<i>Points available</i>	<i>Points earned/block</i>				
		1	2	3	4	5
1. Soil and water conservation.						
a. If irrigation is used, drip or trickle is installed to ensure adequate water supply and minimize water use and foliage wetness. <i>If no irrigation is used, award 1 point.</i>	1					
b. If irrigation is used, a rain-activated shutoff device, evapotranspiration or soil moisture monitoring are used to schedule irrigation timing/amounts. <i>If no irrigation is used, award 1 point.</i>	1					
c. On slopes with potential for erosion, tree rows are planted with contours.	1					
d. On roads with slopes with potential for erosion, water bars are installed.	1					
e. Tile drainage is installed and maintained in poorly drained soils, or trees are not planted in poorly drained soils.	2					
f. On sites at risk of wind-eroded soil, windbreaks are installed and maintained.	1					
g. A Conservation Plan for the farm has been developed according to NRCS standards; sensitive resource areas of the farm have been identified, and environmental risks (e.g., runoff containing nutrients or pesticide residues) have mitigations in planned or already in place (e.g., spray setbacks, field borders, buffer strips, etc).	2					
h. USDA NRCS WIN-PST software is used to evaluate the pesticides used in the orchard for impacts on water quality. See http://www.ipm.ucdavis.edu/TOX/watertox1.php or contact NRCS.	2					
Total Points Part 1:	11					

Notes, additional practices used:

	<i>Points available</i>	<i>Points earned/block</i>				
		1	2	3	4	5
2. Pesticide Use and Hazard Reduction.						
a. Tractor cabs plus required PPE are used to protect applicators during applications.	2					
b. DANGER or WARNING labeled pesticides are not used.	2					
c. At least 25% of trees are disease resistant varieties and are not treated with fungicides for those diseases to which the varieties are resistant.	2					
d. At least 50% of trees are on M7 or smaller size-controlling rootstocks.	1					
e. Herbicides are not used in alleyways/drive rows.	1					
f. Herbicides are not used in tree rows; weeds are managed by non-chemical means.	1					
g. Alternate row mowing is done to preserve beneficials.	2					
h. Alternate row pesticide applications replace at least two full block applications.	1					
i. At least two insecticide applications are at reduced rates.	1					
j. No organophosphates are used as insecticides.	2					
k. No EBDC fungicides (e.g., Dithane, Manzate, Pencozeb, Polyram) are used.	2					
l. Post-harvest litter chopping or urea treatment are used to reduce scab pressure.	2					
m. Potential Ascospore Dose is assessed by systematic fall scouting; scab management is adjusted as per results.	2					
n. No miticides are used other than an early season oil spray. Mites are managed principally by conserving natural enemies.	2					
o. Mite thresholds are adjusted upwards based on varietal susceptibility, current or anticipated weather, or other factors reducing potential for economic injury.	1					
p. Apple maggot is controlled without pesticide sprays, e.g., by trap out.	2					
q. Grower experiments with sampling wild hosts of summer diseases adjacent to the orchard to assess inoculum pressure and adjusts fungicide programs as per results.	2					
r. All abandoned apple trees within 100 yards are removed to reduce immigration of codling moth and other pests.	1					
s. Wild hosts of tarnished plant bug are removed from the orchard and immediately adjacent areas to reduce tarnished plant bug populations.	1					
t. All red cedar and juniper trees within 100 yards are removed to reduce cedar rust inoculum in problem blocks.	1					
u. Rodents are managed without rodenticides, e.g., by mowing, mouse guards, removing drops, encouraging predators.	1					

v. Where codling moth requires intervention, mating disruption and/or bioinsecticides containing granulosis virus are used.	1					
w. Where Oriental fruit moth requires intervention, mating disruption is used.	1					
Total Points Part 2:	34					

Notes, additional practices used:

3. Grower education and self-improvement.	Points available	Points earned
a. Grower has hosted a field day or other production-related educational meeting within last three years. List date, name/description of event:	1	
b. Grower has conducted on-farm research using control (e.g., untreated) trees for comparison within the last three years. List subject of research, dates:	2	
c. Grower belongs to state and/or regional grower organization. List organizations:	2	
4. Energy conservation.		
a. Energy-efficient lighting is used in office, packing and storage facilities.	1	
b. Alternatives (e.g., solar, wind) are used to meet at least 10% of electricity needs. List:	1	
c. Alternatives (e.g., biodiesel) are used to meet at least 10% of fuel needs. List:	1	
d. Storage energy use has been conserved by measures implemented in the last three years. List:	1	
5. The following materials from office, field, packing house and storage are recycled.		
a. Paper and cardboard	0.25	
b. Plastic	0.25	
c. Aluminum	0.25	
d. Glass	0.25	
e. Used pesticide containers where consistent with regulations	0.25	
f. Batteries	0.25	
g. Computers and other recyclable office equipment	0.25	
h. Engine oil	0.25	
Total Points Part 3-5:	11	

6. Food Safety and Product Quality	Points available	Points earned
a. Clean plastic bins are used to store fruit.	1	
b. Field bins, storage rooms and packinghouses are sanitized annually after storage and packing are completed.	1	
c. Packing facility has a written Standard Sanitary Operating Procedures plan.	1	
d. Packing line water flumes are chlorinated or otherwise treated to reduce potential for post-harvest diseases.	1	
e. Need to use DPA to reduce scald is determined at least in part by a temperature model, for example, accumulation of hours below 10° C prior to harvest.	1	
f. Cider production facility (if any) has a written HACCP plan.	1	
g. Farm is third-party certified for Good Agricultural Practices (e.g., by auditing firm, government agency and/or EurepGAP).	1	
h. Farm has a written Good Agricultural Practices plan.	1	
Total Points Part 6:	7	

Notes, additional practices used:

	Points available	Points earned/block				
SCORE CARD: Growers in the program more than one season must earn a total of at least 24 points for each block. First year growers must earn at least 20 points for each block.		1	2	3	4	5
Total Points Part 1. Soil and water conservation.	11					
Total Points Part 2. Pesticide use and hazard reduction.	34					
Total Points Part 3-5. Grower education, resource conservation.	11					
Total Points Part 6. Food safety and product quality.	8					
Total Score (add columns, include total for Parts 3-6 in each column total)	64					

III. Beneficial Practices and Pesticide Hazard Ranking

The following practices and products are listed for Northeast apple production. Pesticide active ingredients have been evaluated for necessity to produce quality apples in the Northeast in commercial quantities, and for hazards to humans, natural enemies and other non-targets, potential to contaminate groundwater and resistance management. This is not an exhaustive list of practices or products. There are more than 1200 active pesticide registrations for apples!

Note: Brand names are for reference only. Additional brand names may also be available.

Pesticide hazards were analyzed using the database at www.pesticideinfo.org, which collates which collates information from recognized authorities such as US EPA and individual State Lead Agencies (SLAs) for pesticide regulation. SLAs are housed in state departments of agriculture or state environmental management agency, depending on the state.

The following criteria were used to evaluate pesticides:

- Acute toxicity to wildlife, fish, aquatic invertebrates:** Product label
- Acute toxicity:** Caution, Warning or Danger Label/US EPA
- Neurotoxin:** Cholinesterase inhibitor or listed on Toxics Reduction Inventory maintained by US EPA
- Possible, likely, probable carcinogen:** US EPA, State of California, International Agency for Research on Cancer
- Reproductive/developmental toxin:** US EPA, State of California
- Toxic to pollinators, key natural enemies/secondary pests:** Product label, Extension recommendations, variety of published sources
- Toxic to wildlife:** Product label
- Suspected endocrine disruptor:** Illinois EPA, Keith, Colburn or Benbrook lists
- Broad spectrum pesticide:** Extension recommendations
- Resistance risk:** Extension recommendations
- Potential or known groundwater contaminant:** State of California, variety of published sources

The following process was used to determine use and use restrictions:

- a. Pesticide options currently in use by growers, or suggested by growers or others, are reviewed for status re the criteria listed above.
- b. There are more than 1000 pesticides labeled for use on apples. We only review those products currently in use or with strong potential for use, as suggested by participating growers and others.
- c. Pesticides that are useful for our pest issues that do not have hazards as per our criteria, or pesticides with relatively readily mitigated hazards, are placed in "Use with Justification" category. For example, for most products, aquatic toxicity is readily addressed by following label restrictions to avoid contamination of water bodies. **No pesticides may be used without justification, e.g., sampling and thresholds, or weather monitoring, or block history of a problem where sampling or monitoring methods and thresholds are not available.**
- d. Pesticides with hazards that are less readily mitigated are placed in the "Do Not Use" category. These are then reviewed for necessity in order to produce commercial

quality fruit economically. Our goal is to limit the use of products with hazards to those we cannot do without.

- e. Products that needed to address a key pest are then moved to the “Use with Restrictions” category. Measures that we can take to mitigate hazards are included, e.g., limiting the number of applications, or limiting use to one pest issue where the product is critical for adequate control.
- f. Other products with similar hazards are not moved to the “Use with Restrictions” category just because the hazard profile is similar to those already in that category, but only if their use is a critical need that we identify as a group.
- g. This is a subjective process. Definitive data are not available on many of the considerations here, e.g., thresholds are lacking for many pests, efficacy is variable, development of resistance is a concern if available modes of action are limited. We don’t know fore sure exactly where to draw the line. We try to reach consensus on issues but realize this will not be possible in all cases. The protocol belongs to Red Tomato, which delegates the final decision on contentious issues to the IPM Institute.

IMPORTANT: All of the following products may not be registered in every state. Please confirm that product is labeled for use in your state before using! Follow recommendations in your state's apple production guide for all products and techniques used.

NON-CHEMICAL PRACTICES – Partial list of practices with potential to reduce reliance on pesticides in Northeast apple production.	
Practice	Description/Comments
Disease Management	
litter chopping	flail mowing after leaves have fallen in late fall or before bud break in early spring to reduce apple scab inoculum
Weed Management	
cultivation, cover cropping	Special precautions must be taken to avoid root damage; fall-planted cover crops reduce erosion risk.
flaming	Zeke Goodband has experience with Red Dragon equipment.
mowing	Planting slower growing varieties of ground cover can reduce mowing requirement.
mulching	Of bio-mulch options, woodchips may be best to minimize vole problems. Fabric/geotextile and living mulches (e.g., clover) are also options. Careful investigation and testing of these options is recommended.

USE WITH JUSTIFICATION – Use only after systematic scouting or weather monitoring and science-based thresholds, or according to previous history where thresholds are not available, and only if registered for your intended use in your state and in accordance with all label directions. Resistance management strategies should be used, with particular emphasis on uses at greatest risk, some of which are noted below.		
Active ingredient	Trade name	Comments
Disease Management		
<i>Bacillus subtilis</i>	Serenade	Not a ready substitute for other fungicides. See Quick Guide or Extension recommendations for use against fire blight in rotation with streptomycin.
copper hydroxide	Kocide formulations with CAUTION label	toxic to fish and aquatic invertebrates, maximum of two applications per year to limit impact on soil, earthworms)
copper oxychloride	COCS	toxic to fish and aquatic invertebrates, maximum of two applications per year to limit impact on soil, earthworms
cyprodinil	Vanguard	toxic to fish and aquatic invertebrates, potential ground water contaminant
lime sulfur, Bordeaux mixture		Limit applications to reduce negative impacts on fruit size and number.
phosphorous acid	Phostrol, Reliant	
sulfur		Limit reliance on sulfur to reduce potential for negative impacts on soil quality.
urea		5% applied to fallen foliage to increase decomposition and reduce apple scab inoculum
Weed Management		
clove oil, acetic acid, lemon juice	Caution label formulations only, e.g., Matran EC	These products are <u>not</u> ready substitutes for other herbicides. Efficacy is typically at least 10% less than other herbicides with much shorter duration weed suppression.
fluazifop-p	Fusilade	toxic to fish, non-bearing trees only, apply during active grass growth

flumioxazin	Chateau	toxic to aquatic invertebrates
glyphosate, sulfosate	Roundup, Touchdown	limit applications and rotate with different mode of action to slow development of resistant weeds
Insect/Mite Management		
acequinocyl	Kanemite	toxic to aquatic invertebrates, make no more than two post-bloom miticide applications per season
acetamiprid	Assail	toxic to wildlife, toxic to bees, may result in spider mite flare up
apple maggot traps	baited, sticky or insecticide-coated spheres	baited, sticky or insecticide-coated spheres
<i>Bacillus thuringiensis</i>	Agree, Dipel, Deliver, MVP	
granulosis virus	Cyd-X	
indoxacarb	Avaunt	toxic to mammals, birds, fish, aquatic invertebrates
kaolin clay	Surround	
mating disruption	CheckMate, Disrupt, IsoMate; hand-applied and sprayable pheromone formulations	
oil	Damoil, Sunspray, Omni, PureSpray	toxic to fish
pyriproxyfen	Esteem	
spinosad	Spintor, Success/Entrust	toxic to bees
Other		
prohexadione calcium	Apogee	
calcium chloride		
DPA	No Scald, Shield	Use CAUTION label formulations only
MCP		

USE WITH RESTRICTIONS – Use with justification and only when less hazardous alternatives (e.g., those in the list above) are not adequate. Follow all restrictions listed below and in accordance with all label directions and only if permitted in your state.			
Active ingredient	Trade name	Concerns	Use restrictions
Disease Management			
captan	Captan, Captac	acute toxicity (DANGER and WARNING label formulations), toxic to fish, carcinogen under prolonged exposure to high doses	1. Use lower rates for summer diseases.
copper hydroxide	Kocide, WARNING or DANGER label formulations	acute toxicity, toxic to fish and aquatic organisms	1. Use CAUTION label formulations where possible. 2. Maximum of two applications per season to limit impacts on soil and earthworms.
copper sulfate	Cuprofix, Disperss		
dodine	Cyprex, Syllit	acute toxicity (DANGER label), resistance	1. Do not use where resistance is suspected.
EBDCs:			
maneb, mancozeb	Dithane, Manzate, Pencozeb	probable carcinogen, developmental toxin, suspected endocrine disruptor, acute aquatic toxicity	1. Follow label restrictions on timing and rates. 2. If miticides are used other than oil, do not apply EBDCs after petal fall to preserve mite predators.
metiram	Polyram		
fludioxinil	Scholar	toxic to fish and aquatic invertebrates	
pyraclostrobin, boscalid (nicobifen)	Pristine	possible carcinogen, toxic to fish and aquatic invertebrates	
sterol inhibitors:			
fenarimol	Rubigan	suspected endocrine disruptor, resistance	1. Do not use where resistance is known. 2. Maximum of four applications per season. 3. Use only in combination or rotation with a protectant fungicide. 4. Do not use two seasons in a row. 5. Do not use after first cover. 6. No registered in NY as of April 3, 2009.
fenbuconazole	Indar	toxic to fish, aquatic invertebrates, algae; EPA possible carcinogen related to crystalline silica content; reproductive effects on female animals	

myclobutanil	Rally	acute toxicity, developmental/reproductive toxicity, acute aquatic toxicity, resistance	
triflumizole	Procure	acute aquatic toxicity, potential groundwater contaminant, resistance	
streptomycin	Agri-mycin, Firewall		<ol style="list-style-type: none"> 1. Apply only during bloom when fire blight is predicted by Maryblyt or Cougarblight. 2. After bloom, apply only following hail storms in orchards with existing infections. <i>Post-bloom application is also allowed for blister spot on susceptible varieties, e.g., Crispin, Mutsu.</i>
thiophanate-methyl	Topsin-M, T-Methyl	likely carcinogen, reproductive/developmental toxin, potential groundwater contaminant, resistance	<ol style="list-style-type: none"> 1. Use only where heavy apple scab or summer disease pressure is indicated by scab severity or block history of summer diseases. 2. Do not use where resistance is suspected.
trifloxystrobin	Flint	resistance	<ol style="list-style-type: none"> 1. Do not use more than four times per season. 2. Use only in rotation with a different mode of action. Do not use back-to-back applications.
Weed Management			
clethodim	Select Plus (CAUTION label formulations)	potential groundwater contaminant	<ol style="list-style-type: none"> 1. Non-bearing trees only.
glufosinate ammonium	Rely	acute toxicity	
napropamine	Devrinol	moderate aquatic toxicity	<ol style="list-style-type: none"> 1. Do not apply to frozen ground. 2. Requires rainfall or irrigation within 24 hours to activate 3. Incorporate to 2-4" depth within 24 hours if no rainfall/irrigation. 4. Do not apply to soils w/ >10% organic matter.
paraquat dichloride	Gramoxone Super, Gramoxone Extra	acute toxicity, potential groundwater contaminant, moderate aquatic toxicity	<ol style="list-style-type: none"> 1. Use only before June 30 and only to control root suckers or on non-bearing trees. Limited to one application per season.
pelargonic acid	Scythe	acute toxicity	
sethoxydim	Poast Plus (CAUTION label formulations)	potential groundwater contaminant, moderate aquatic toxicity	

simazine	Princep, Simazine	possible carcinogen, reproductive toxin, known groundwater contaminant, acute aquatic toxicity	1. Maximum of one application per season of either simazine or terbacil (not both).
terbacil	Sinbar	developmental toxin, potential groundwater contaminant	
Insect/Mite Management			
bifenazate	Acramite		1. Make no more than two post-bloom miticide applications per season.
chlorantraniliprole	Altacor	toxic to aquatic organisms and certain beneficial, potential groundwater contaminant	1. Make no more than three applications per season. Use against one generation of the target pest only. 2. Not registered in NY as of April 3, 2009.
chlorpyrifos	Lorsban	acute toxicity, cholinesterase inhibitor, suspected endocrine disruptor, broad spectrum	1. Use for dogwood borer only. 2. Use only if painting the trunk and covering burr knots with soil fails to manage the problem.
granulosis virus	Carpovirusine, Cyd-X	acute toxicity, substantial temporary eye injury	
clothianidin	Clutch	toxic to aquatic invertebrates, toxic to bees	1. Not registered in NY.
emamectin, benzoate	Proclaim	toxic to fish, birds, mammals and aquatic invertebrates; Restricted Use Pesticide	
etoxazole	Secure, Zeal	toxic to aquatic invertebrates	1. Make no more than two post-bloom miticide applications per season.
flubendiamide	Belt	toxic to aquatic invertebrates, potential groundwater contaminant	1. Make no more than three applications per season. Use against one generation of the target pest only. 2. Not registered in NY as of April 3, 2009.
imidacloprid	Provado	highly toxic to bees and aquatic invertebrates; toxic to wildlife	
methoxyfenoxide	Intrepid	hazardous to aquatic invertebrates, potential groundwater contaminant	
spinetoram	Delegate	highly toxic to bees, toxic to aquatic invertebrates	1. Make no more than three applications per season. Use against one generation of the target pest only.
spirodiclofen	Envidor	toxic to fish and aquatic invertebrates, highly toxic to bees	1. Not registered in NY as of March 2009. 2. Make no more than two post-bloom miticide applications per season.

spirotetramat	Movento	toxic to aquatic invertebrates and oysters, potential groundwater contaminant, potentially toxic to honey bee larvae	1. Maximum of 25 oz. per acre per season. 2. Not registered in NY as of April 3, 2009.
thiacloprid	Calypso	likely carcinogen at high doses, acute toxicity (WARNING label), extremely toxic to marine invertebrates	1. Use for plum curculio and European apple sawfly only.
thiamethoxam	Actara	Toxic to wildlife; highly toxic to aquatic invertebrates; highly toxic to bees; potential groundwater contaminant	
Other			
carbaryl	Sevin	extremely toxic to aquatic invertebrates, highly toxic to bees	1. Time application for thinning only; do not use after application is no longer effective for thinning.
ethephon	Ethrel		1. Use for enhancing return bloom or thinning only. 2. Do not use for fruit ripening.

DO NOT USE		
Active ingredient	Trade name	Concerns
Disease Management		
difenoconazole	Inspire Super MP	acute toxicity, possible carcinogen, toxic to fish, mammals and aquatic invertebrates; persistent runoff potential
ferbam	Ferbam	acute aquatic toxicity
kresoxim-methyl	Sovran	likely carcinogen, suspected groundwater contaminant
mefanoxam	Ridomil Gold	acute aquatic toxicity
pyrimethanil	Scala	possible carcinogen, suspected endocrine disruptor
thiabendazole	Mertect	likely carcinogen (high doses), developmental toxin
thiram	Thiram	reproductive/developmental toxin, suspected endocrine disruptor
triadimefon	Bayleton	acute toxicity (DANGER, WARNING label formulations), possible carcinogen, reproductive/developmental toxin, suspected endocrine disruptor, resistance
ziram	Ziram	acute toxicity, likely carcinogen, developmental/reproductive toxin, suspected endocrine disruptor
Insect/Mite Management		
abamectin	Agri-Mek	acute toxicity, developmental toxin, acute aquatic toxicity
azinphos-methyl	Guthion	acute toxicity, cholinesterase inhibitor, broad spectrum
clofentezine	Apollo	possible carcinogen, suspected endocrine disruptor
endosulfan	Thionex	acute toxicity, suspected endocrine disruptor, broad spectrum
esfenvalerate	Asana	acute toxicity, extremely toxic to fish and aquatic invertebrates, highly toxic to bees, toxicity to beneficials, suspected endocrine disruptor
fenpropathrin	Danitol	acute toxicity, toxicity to beneficials, acute aquatic toxicity
formetanate hydrochloride	Carzol	acute toxicity, toxicity to beneficials, potential groundwater contaminant, acute aquatic toxicity
hexythiazox	Savey	possible carcinogen, moderate aquatic toxicity
lamda cyhalothrin	Warrior	acute toxicity, toxicity to beneficials, suspected endocrine disruptor, acute aquatic toxicity
malathion		cholinesterase inhibitor, broad spectrum
novaluron	Rimon	acute toxicity (WARNING label)
oxamyl	Vydate	acute toxicity, broad spectrum
permethrin	Pounce, Ambush	acute toxicity, toxicity to beneficials, possible carcinogen, suspected endocrine disruptor, acute aquatic toxicity, broad spectrum
pyridaben	Nexter	acute toxicity, acute aquatic toxicity
phosmet	Imidan	acute toxicity, cholinesterase inhibitor, broad spectrum
Weed Management		
2,4, D amine	2,4-D	acute toxicity
clethodim	Select, Prism	acute toxicity (DANGER, WARNING label formulations), potential groundwater contaminant
dichlobenil	Casoron	possible carcinogen, potential groundwater contaminant, moderate aquatic toxicity
diquat dibromide	Diquat	acute toxicity, potential groundwater contaminant, moderate aquatic toxicity
diuron	Direx, Karmex	known carcinogen, developmental toxin, acute aquatic toxicity
norflurazon	Solicam	possible carcinogen, known groundwater contaminant, moderate aquatic toxicity

oryzalin	Surflan	likely carcinogen, potential groundwater contaminant, acute aquatic toxicity
osoxaben	Gallery	possible carcinogen, potential groundwater contaminant, moderate aquatic toxicity
oxyfluorfen	Goal	possible carcinogen, acute aquatic toxicity
pendimethalin	Prowl	possible carcinogen, suspected endocrine disruptor, moderate aquatic toxicity
pronamide	Kerb	probable carcinogen, potential groundwater contaminant, moderate aquatic toxicity
sethoxydim	Poast	acute toxicity (DANGER, WARNING label formulations), potential groundwater contaminant, moderate aquatic toxicity
Other		
DPA	DPA	acute toxicity (DANGER label formulations)

IV. Acknowledgements & References

The following project partners and others provided helpful comments on the current protocol drafts:

Art Agnello, Extension entomologist, Cornell University
Tom Akin, agronomist, USDA Natural Resources Conservation Service
John Aue, Threshold IPM Services, crop consultant
Calvin Beekman, apple grower
Mike Biltonen, apple grower
Walter Blackler, apple grower
Rich Bonanno, Extension weed specialist for vegetable crops, UMass, and grower
Juliet Carroll, Extension fruit IPM coordinator and plant pathologist, Cornell University
Aaron Clark, apple grower
Jon Clements, Extension tree fruit specialist, UMass
Bill Coli, Extension specialist, UMass
Dan Cooley, plant pathologist, UMass
Sue Futrell, communications director, Red Tomato
Rob Koch, Apple Leaf, crop consultant
Kerik Cox, Extension plant pathologist, Cornell University
Greg Krawczyk, Extension entomologist, Penn State University
Zeke Goodband, apple grower
Barney Hodges Sr., Barney Hodges Jr., Christiana Hodges, Dee Hodges, apple growers
Marilyn and Steve Meyerhans, apple growers
Tracy Leskey, research entomologist, USDA ARS
John Lyman, apple grower
Harvey Reissig, Extension entomologist, Cornell University
Michael Rozyne, director, Red Tomato
Glen Schreiter, apple grower
Andrea Szylvian, pesticides/agriculture manager, US EPA Region I
Peter Ten Eyck, apple grower
Vito, Bill and Joel Truncali, apple growers
Arthur Tuttle, Extension IPM field leader, plant pathology
Starker Wright, USDA ARS

The following funders have supported this work:

US Environmental Protection Agency (EPA) Strategic Agricultural Initiative, Region I
USDA CSREES Northeastern IPM Center
USDA NRCS Conservation Innovation Program
USDA CSREES Crops at Risk Program
W. K. Kellogg Foundation
Whole Foods
An anonymous foundation and many generous individuals

The following references were used to develop this document:

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V. Revisions to the 2009 Edition

1. Revised summer pruning requirement to specify semi-dwarf or standard-sized trees and exception for fire blight. (p 6)
2. Added details about codling moth pheromone trap thresholds. (p 8)
3. Added suggestion to increase number of traps in small blocks or blocks with lengthy perimeters. (p 9)
4. Added chlorantraniliprole (Altacor), flubendiamide (Belt), spinetoram (Delegate) and spirotetramat (Movento) to insecticides, use with restrictions. (p 22-23)
5. Added febuconazole (Indar) to use with restrictions. (p20). Added difenoconazole (Inspire) to do not use. (p24)
6. Moved ferbam, thiram and esfenvaterate (Asana) to do not use. (p 24)
7. Updated acknowledgements with new participants and reviewers. (p 26)

VI. Participating Grower Affidavit and Agreement

1. Participating grower certifies that the attached self-evaluation and records represents a complete and accurate account of grower practices on acres to be certified at the time the self-assessment is completed and reviewed by the inspector and the IPM Institute for the purposes of certifying participating production.
2. Participating grower agrees to allow access to farm and records for scheduled and unannounced inspections to verify compliance with program requirements including information provided on the self-evaluation and use of Eco Apple brand packaging and promotional materials.
3. Participating grower agrees that Eco Apple certification is approved solely by the IPM Institute of North American and if granted, is for one season only and only for product from participating production units reported in this self-assessment and certified by the IPM Institute.
4. Participating grower agrees not to market any product as Eco Apple brand apples, including use of Eco Apple packaging or other Eco Apple promotional materials or identification, until certification for the product is approved in writing by the IPM Institute. Participant further agrees that if certification is not approved, no product will be marketed as Eco Apple brand apples and no packaging or promotional materials bearing Eco Apple identification will be used. Participant agrees to bear any costs associated with denial of certification including the cost of Eco Apple packaging and promotional materials purchased by the grower.
5. Participating grower acknowledges that participation does not constitute or imply an endorsement by the IPM Institute of North America or Red Tomato of the participating grower or operation.

Participating Grower Name

Signature

Date

VII. Submission Checklist

- ____ a. Completed self-evaluation
- ____ b. Pesticide, fertilizer, thinner and growth regulator application records for blocks to be certified including product cost per unit. See page 2 for required information.
- ____ c. Scouting records for blocks to be certified. See page 2 for required information.
- ____ d. Certification fee.

Fees

Annual certification/inspection fee: \$_____ Due annually by August 1 with the updated self-evaluation and pesticide application records. The fee* is based on the number of acres of apples to be certified:

0-99 acres	\$350
100-199	\$450
200-299	\$550
300-399	\$650
≥ 450 acres	\$750

Credit cards or checks accepted.

Credit card number: _____ exp. date: ____/____

Name on card: _____

Billing address: _____

City/state/zip: _____

*An additional fee may be charged if pesticide application records are not in electronic format. Additional fee to be based on time required to enter application records into TracApple or other acceptable electronic format. Send completed self-evaluation, pesticide application records and required fee to: *IPM Institute of North America, 4510 Regent St., Madison WI 53705. 608 232-1410, Fax 608 232-1440, ipmworks@ipminstitute.org*

