



Truearth Protocol and Self-Assessment

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Locally grown goodness.

TM

2019 Growing Season – 04/02/2019

See page 35 for list of revisions to this edition.

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Download the most recent protocol at ipminstitute.org/Truearth.htm

The Truearth Certified™ Protocol

This protocol was developed to recognize the accomplishments of apple producers in the Upper Mississippi River Valley of Minnesota and Wisconsin. Since 2010, with support from the United States Environmental Protection Agency and Department of Agriculture, we have worked to identify opportunities to achieve a measurable reduction in the use of highly toxic pesticides. By organizing these practices into the *Truearth Certified Protocol*, we hope to contribute to the supply of quality local foods and improve our soil and water resources, wildlife biodiversity, farmworker safety, farm stability and farmland preservation.

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 of Noxious Animals and Plants (IOBC). This effort first began with the Red Tomato Eco Apple Protocol, redtomato.org/eco, and with their permission, we have used their protocol as a platform to identify best practices to address pest management and production challenges in our region.

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.

Roles and Procedures

Wescott Agri Products is the lead organization responsible for market approach and overseeing use of Mississippi Valley Fruit Company trademarks. Annually, Wescott Agri Products and its partners will review and evaluate the Protocol and Self-Assessment, and make adjustments where needed to continue to achieve our goals.

The IPM Institute of North America, an independent non-profit organization, is responsible for final decisions on standards and approval of certification status and use of the Truearth trademark. The IPM Institute contracts directly with growers to provide an on-site inspection which will be conducted by the IPM Institute or an independent third party. This inspection verifies compliance with the standard and has a special emphasis on evaluating compliance to criteria that are not measurable through documentation and records submitted to the IPM Institute for review prior to the inspection.

Participating Growers will be evaluated based on practices implemented. A current version of the *Truearth Protocol and Self-Assessment* and Quick Guide is always available at ipminstitute.org/Truearth.htm.

To apply for and maintain certification, follow these steps:

1. Complete this Self-Assessment and submit to the IPM Institute with:
 - A. Scouting records, trap counts and weather data. Scouting records must include date, block(s), pest and result, e.g., captures per trap, mites per leaf, etc.
 - B. Pesticide, fertilizer, thinner and plant-growth regulator application records to the IPM Institute. Application records must be submitted electronically and include at least the date and time application started and ended, crop, block(s), acreage, trade name and formulation of material applied (with EPA registration number, active ingredient, target pest for pesticides and duration of Restricted-Entry Interval), rate per acre (oz., gal. or lb./acre), application method. Record keeping can be improved by using an electronic record-keeping spreadsheet, such as those offered by Penn State ([Penn State Spray Record-Keeping Spreadsheet](#)) or Cornell University ([TracApple](#)).

If these required items are not received by the posted date, the IPM Institute will assess late fees for each week certification materials are late. The IPM Institute will digitize spray records not submitted in an electronic format. This service will be charged based on an hourly rate for time required for digitization and a final copy of the electronic record will be sent to the grower. Note: The IPM Institute of North America maintains confidentiality of all grower records which include, but are not limited to: Self-Assessment, pest-monitoring records, weather data, and records of pesticide, fertilizer, thinner and plant-growth regulator applications.

2. The IPM Institute will appoint an inspector during the first year of certification and every third year thereafter. The inspector will verify the information provided during an on-site audit scheduled prior to marketing of certified fruit. Growers will be invoiced by the IPM Institute for the on-site audit. The audit fee is separate from and in addition to the annual fee paid for certification.

Provisions for Emergencies

Contact the IPM Institute at the earliest indication that an emergency is developing that cannot be managed without violating the certification standards. The IPM Institute will investigate the concern and if necessary, consult with scientific advisors to assess the problem and determine if an exception to the protocol is justified.

Participants may expect the following support from the IPM Institute and project advisors regarding handling requests in emergency situations:

1. Receipt of requests for protocol exceptions will be acknowledged by the IPM Institute within one business day.
2. A response to the request with proposed options and resolution will be completed within one to three business days. This time is needed to allow the IPM Institute to contact scientists and project advisors and investigate appropriate solutions.

Protocol Format

1. **Minimum Requirements and Reference Guide (Section I)** includes practices required for fruit to be eligible for Truearth Certification. The Reference Guide discusses additional compliance criteria and practice exemptions that may apply. The criteria in the Reference Guide must be met to meet certification standards and is subject to review for compliance during on-site and desk audits. page 6
2. **Scored-Advanced Practices (Section II)** allows producers to select a group of sustainable elements best suited to meet specific crop production and pest management challenges. page 11
3. **Pesticide Hazard Ranking and Use Restrictions (Section III)** identifies pesticide restrictions which exceed label requirements, prohibited pesticides and hazards associated with all pesticides. page 19

SELF-ASSESSMENT 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. Blocks not enrolled in Truearth Certified should not be included. Cultivars not eligible for certification located within an enrolled block should not be included. Attach additional pages if needed to list all blocks.

| Block ID | Cultivars | Acres | Annual Production (Bushels) |
|----------|-----------|-------|-----------------------------|
| | | | |

I. Minimum Requirements. Grower must answer yes to all of the following for all blocks in the program, to be eligible for certification. Explain any No or NA answers. Attach additional pages as needed.

| Enter: Y for yes, N for no or NA for not applicable in box to the left of each question. | | Reference Guide |
|--|----------|--|
| Legal Requirements | | |
| 1 | Y/ N/ NA | <p>Does farm comply with all legal requirements for pesticide and nutrient applications? ^S</p> <ul style="list-style-type: none"> • Worker Protection Standard (WPS) requirements are followed, epa.gov/pesticide-worker-safety/agricultural-worker-protection-standard-wps. • Pesticide applications meet label requirements. • Distance from pesticide mixing and well head meets state legal requirements. • Food Safety Modernization Act (FSMA) requirements are followed www.fda.gov/downloads/Food/GuidanceRegulation/FSMA/UCM472887.pdf. |
| Soil and Water Conservation | | |
| 2 | | Are visibly eroded areas minimal, and when found, are they corrected? ^S |
| 3 | | Do vegetated buffers separate surface water from managed apple trees by at least 50 ft.? ^S |
| 4 | | <p>Are nutrients applied based on results from soil and/or foliar analyses and are these records for the last 12 months available for inspection? ^S</p> <ul style="list-style-type: none"> • Test soil at least once every three years. Soil-test results include: soil-organic matter, pH, nitrogen, phosphorus, potassium, calcium and magnesium. • Does not apply to foliar applications of calcium chloride or calcium nitrate used to manage bitter pit. |
| 5 | | <p>Are ground applications of nitrogen applied only between bud break and July 1st? ^D</p> <ul style="list-style-type: none"> • If total nitrogen exceeds 50 lb. per acre, application must be split by at least one week. • Does not apply to post-harvest urea applications to leaf litter for apple scab management. |

Superscripts indicates practice-verification process. Reference the following throughout page 6 - 17:

^D Verified during desk audit via submitted paperwork

^S Verified during site audit

| Pesticide Use and Hazard Reduction | | |
|------------------------------------|--|---|
| 6 | | Are trees pruned to allow penetration of light, air and spray material? ^S |
| 7 | | Is pruning debris remaining in the field flail chopped, mowed or removed to suppress insect pest and disease inoculum? ^S |
| 8 | | Are pesticide and nutrient application equipment calibrated according to the manufacturer's instructions, at least annually? ^S |

- Procedures, results, adjustments made and name of individual who performed the most recent calibration are available for inspection.
- Airblast sprayer calibration verifies gallon per acre (GPA) application rates by documenting travel-ground speed, gallon-per-minute flow rates of nozzles, sprayer pressure and tree-row widths.
- Spray control systems including GPS and flow meters are calibrated during initial installation and inspected annually for maintenance needs and recalibrated when necessary, e.g., after parts replacement.
- Growers contracting with custom applicators should request verification that equipment is calibrated.
- Calibration for airblast sprayer: extension.psu.edu/sprayer-calibration-information
sprayers101.com/airblast-output
sprayers101.com/how-to-calibrate-an-airblast-sprayer-operator
- Calibration for boom sprayer: extension.colostate.edu/docs/pubs/farmmgmt/05003.pdf
- Calibration for rotary spreader: pesticidestewardship.org/calibration/Pages/RotarySpreader.aspx
- Calibration for a drop spreader: pesticidestewardship.org/homeowner/how-to-calibrate-a-drop-spreader
- Note: Tree-row volume is helpful in determining the appropriate GPA of water based on tree size, canopy density and row width.

| | | |
|---------------------------------------|--|---|
| 9 | Are average wind speed and direction used at time of application to reduce potential for drift? ^S | <ul style="list-style-type: none"> Label requirements referencing maximum wind speeds are followed. Weather data may be obtained from hand-held devices or weather services via the internet. |
| 10 | Are pesticides with an EPA pollinator toxicity advisory box on the label not applied between tight cluster and the end of crop bloom? ^D | <ul style="list-style-type: none"> New EPA pollinator advisory box, pesticidestewardship.org/wp-content/uploads/sites/4/2016/07/bee-label-info-graphic.pdf. Information on selecting pesticides least toxic to pollinators is available through Oregon State Extension, catalog.extension.oregonstate.edu/sites/catalog.extension.oregonstate.edu/files/project/pdf/pnw591.pdf. |
| 11 | Are pesticides no longer used or no longer registered for use returned to dealer or disposed of at the next collection? ^S | <ul style="list-style-type: none"> While in storage, obsolete pesticides are clearly marked 'DO NOT USE' and separated from pesticides in current use. |
| Pest Monitoring and Management | | |
| 12 | Can an orchard staff member or crop advisor identify the: ^S <ul style="list-style-type: none"> Major and emerging insect pests, diseases and weeds on the farm? Life cycle of major and emerging insect pests, diseases and weeds, as it relates to pest management? Beneficial insects, such as natural predators of crop insect pests? | <ul style="list-style-type: none"> At least one individual employed by or under contract with the farm can visually identify the major and emerging insect pests, diseases and weeds present, describe these pest life cycles and visually identify the major beneficial insects present, e.g., lady beetles, lacewings, syrphid flies, predatory mites, minute pirate bugs, black hunter thrips. |
| 13 | Are pests and diseases scouted, sampled and monitored at least once every two weeks and/or prior to the application of pesticides? ^D | <ul style="list-style-type: none"> Blocks are scouted to gather a representative sample of pest infestations, and to accurately determine if populations exceed action thresholds. |
| 14 | Are scouting observations, degree days, weather data and trap counts documented in a handwritten or electronic format? ^D | <ul style="list-style-type: none"> Documentation of scouting includes specific qualitative and quantitative observations, e.g., number of mites per leaf, biofix dates, specific location of pest infestation, etc. |

| | | | |
|--|--|---|--|
| 15 | | Are pesticide application decisions and timing based on data from the farm and techniques such as action thresholds, degree-day models and decision-support/ predictive systems? ^D | <ul style="list-style-type: none"> • Where available and recommended by Extension or other regional experts, action thresholds are used to determine whether or not and when to take action against pests, e.g., codling moth, apple maggot, plum curculio and apple scab. • Where recommended, models are used to estimate when pests or diseases will require treatment, e.g., accumulation of degree days from a codling moth biofix, apple scab infections, or exceeding threshold on traps, e.g., five apple maggots caught on a baited sphere. |
| Orchard Floor and Weed Management | | | |
| 16 | | Are row middles (drive rows) sod, mulch-covered or cover-cropped year round? ^S | |
| 17 | | Are herbicide strips contained within the canopy drip zone? ^S | |
| 18 | | Does mode of action rotate between each application of an herbicide? ^D | <ul style="list-style-type: none"> • Back-to-back applications of the same mode of action are permitted where consistent with the product label or Extension recommendations. • Applies during and between seasons. |
| 19 | | Are herbicide applications limited to three per season on the same application site? ^D | <ul style="list-style-type: none"> • If adequate control is not achieved, a fourth herbicide application may be applied. Application must be supported with documentation identifying weed species that were not controlled during previous applications. |

| Food Safety and Product Quality | | |
|---------------------------------|--|---|
| 20 | Is fruit harvested according to guidelines from the packing house? ^S | <ul style="list-style-type: none"> Firmness, brix, starch-iodine testing or other accepted measures, may be used. |
| 21 | Are clean toilets and hand-washing facilities available to field, harvest and packing house staff? ^S | <ul style="list-style-type: none"> Practices 21 - 26 have been met if farm has a valid certification for USDA GAP or a Global Food Safety Initiative recognized food safety scheme, e.g., GLOBALG.A.P., PrimusGFS. For more information visit: mygfsi.com/schemes-certification/recognised-schemes.html. |
| 22 | Are manure applications limited to areas outside of bearing orchards? ^S | |
| 23 | Are travel ways between trees and packing and storage facilities inspected for ruts, erosion, bumps or rocks and repaired prior to harvest? ^S | |
| 24 | Are fruit bins and boxes sound and cleaned of soil, plant or animal debris prior to use? ^S | |
| 25 | Are filled harvest containers transported immediately to packing and storage facilities? ^S | |
| 26 | Are packing and storage facilities free from pest and rodent infestations and secured to prevent the intrusion of wildlife and pets, which may contaminate harvested crops? ^S | |
| 27 | Is irrigation water tested in accordance with the FDA Food Safety Modernization Act agriculture water requirement? ^S | <ul style="list-style-type: none"> For more information visit: www.fda.gov/downloads/Food/GuidanceRegulation/FSMA/UCM472887.pdf. |
| Energy and Waste Management | | |
| 28 | Does open burning comply with local ordinances and is it limited to yard waste, wood, pruning debris and paper-based products? ^S | <ul style="list-style-type: none"> Pesticide containers (including paper), plastics, rubber or industrial products may not be disposed of by burning. |
| 29 | Are lead-acid batteries, used oil, industrial chemicals and other hazardous materials disposed of by taking to an approved recycling drop-off location? ^S | <ul style="list-style-type: none"> Approved locations include auto-service centers, municipal or private recycling or hazardous waste-collection facilities. |

II. Scored Advanced Practices. Enter points earned for each advanced practice that is implemented on the farm. Note: To be eligible for points, advanced practices must be implemented on all enrolled acres that benefit from the practice. **See page 18** for total number of points required to earn certification.

| Soil and Water Conservation | | | |
|------------------------------------|------------------------|----------------------|---|
| | <i>Points eligible</i> | <i>Points earned</i> | |
| 30 | 1 | | Is no irrigation used? Note: If earning this point skip to practice 33 below. Do not enter points for practice 31 - 32. ^S |
| 31 | 1 | | Is drip or trickle irrigation installed to ensure adequate water supply and minimize water use and foliage wetness? ^S |
| 32 | 1 | | Where irrigation is installed, is a rain-activated shutoff device, evapotranspiration or soil moisture monitoring used to schedule irrigation timing/ amounts? ^S Note: The Cornell Apple Irrigation Model can be used to determine water demands and plan your irrigation schedule, nwa.cornell.edu/index.php?page=apple-irrigation . |
| 33 | 1 | | Are tree rows planted on contours where slopes have a history of or high potential for erosion? ^S |
| 34 | 1 | | Are water bars installed on roads with slopes with a history of or high potential for erosion? ^S |
| 35 | 2 | | Is tile drainage installed and maintained in poorly drained soils or are trees not planted in poorly drained soils, to improve tree health and minimize disease? ^S |
| 36 | 1 | | Are windbreaks installed and maintained on sites with a history of or high potential for wind-eroded soil? ^S |
| 37 | 3 | | Is an NRCS approved Environmental Quality Incentives Program (EQIP) or Conservation Stewardship Program (CSP) contract in place for any of the following conservation-practice standards: IPM (595), IPM Conservation Activity Plan (114), Pollinator Habitat Plan (146), Conservation Cover – Pollinator Species (327), Cover Crop (340), Field Border – Pollinator Species (386), Upland Wildlife Habitat Management – Honeybee or Monarch (Milkweed inter-seeding) (645)? ^S |
| | 11 | | Total Points: Soil and Water Conservation |

| Pesticide Use and Hazard Reduction | | | |
|------------------------------------|---|--|--|
| 38 | 2 | | Are tractor cabs plus required personal protective equipment used to protect pesticide applicators? ^S |
| 39 | 1 | | Is a spray-control system, e.g., Raven Applied Technology, used to regulate gallon-per-acre application rates of pesticides? ^S |
| 40 | 1 | | Is airblast spray pattern evaluated and adjusted by assessing droplet size and coverage using water-sensitive cards? sprayers101.com/confirm-coverage-with-water-sensitive-paper . ^S |
| 41 | 1 | | Are 'WARNING' labeled pesticides not used? ^D |
| 42 | 1 | | Are 'DANGER' labeled pesticides not used? ^D |
| 43 | 2 | | Are herbicides with high risks to water quality avoided? ^D Note: Applying these high-risk products will not receive credit for this practice: Gramoxone (paraquat-dichloride), Prowl H2O (pendimethalin), Starane Ultra (fluroxypyr-methyl) and Venue (pyraflufen-ethyl). The Pesticide Risk Tool and Windows Pesticide Screening Tool (WIN-PST) were used to identify high risks relating to water quality and aquatic life. |
| 44 | 2 | | Are insecticides which pose high risks to pollinators from drift or foraging pollinators within the orchard avoided? ^D Note: Applying these high-risk products will not receive credit for this practice: Actara (thiamethoxam), Alias/Montana/Wrangler (imidacloprid), Belay (clothianidin), Entrust (spinosad) and Lorsban (chlorpyrifos). None of these products are applied to receive credit for this practice. The Pesticide Risk Tool was used to identify high risks to pollinators. |
| 45 | 1 | | Are at least 50% of trees on M.7 or smaller size-controlling rootstocks? ^S |
| 46 | 2 | | Is fruit thinning completed without carbaryl? ^D |
| 47 | 1 | | Is pollination accomplished without commercially produced bumblebee hives? ^S |
| 48 | 2 | | Is an early season oil spray the only miticide used? ^D |
| 49 | 1 | | Are biopesticides, e.g., <i>Bacillus subtilis</i> , <i>Bacillus thuringiensis</i> , granulosis virus, used? ^D |

| | | |
|----|----|---|
| 50 | 1 | <p>Have two or more full-block insecticide applications been replaced by alternate-row-middle (ARM) applications? ^D</p> <p>Note: Use practice for insecticide applications only, not appropriate for fungicide applications. Additional ARM sprays target opposite row from previous treatments. ARM sprays count as half of one application. Pesticide records must document which rows were treated. For additional information visit, sprayers101.com/alternate-row-middle-spraying.</p> |
| 51 | 1 | <p>Have two or more full-block insecticide applications been replaced by applications to perimeter rows? ^D</p> <p>Note: Use practice for insecticide applications only, not appropriate for fungicide applications. Perimeter sprays include both sides of a tree row up to the first four rows or up to 50 feet from the orchard edge.</p> |
| 53 | 1 | <p>Have two or more full-block insecticide applications been replaced by partial-block applications? ^D</p> <p>Note: Use practice for insecticide applications only, not appropriate for fungicide applications. Applications must meet label restrictions on number of applications to those trees and total amount of active ingredient applied. Pesticide records must document sections of block treated.</p> |
| 54 | 1 | <p>Are grain-based rodenticides (corn, oats) only applied in bait stations or burrows? ^D</p> |
| 55 | 1 | <p>Are rodents managed without rodenticides, e.g., by close mowing, using mouse guards, painting trunks with white latex paint, removing drops or encouraging predators? ^D</p> |
| 56 | 2 | <p>Are the trunks of susceptible cultivars painted with white latex paint or wrapped with white tree guards to reduce winter injury? ^S</p> |
| 57 | 1 | <p>Is the lowest recommended rate of captan applied during the summer for sooty blotch and fly speck management? ^D</p> |
| 58 | 2 | <p>Is a urea treatment applied to reduce apple scab and/or marssonina leaf blotch pressure between post-harvest and silver tip? ^D</p> |
| 59 | 1 | <p>Are fallen fruit removed from beneath trees in blocks where bitter rot is an annual problem, after June drop and hand thinning, or in the fall after harvest? ^S</p> |
| 60 | 1 | <p>Are fire blight and black rot cankers and dead wood removed from trees during winter pruning and destroyed to promote rapid decomposition which reduces sources of overwintering inoculum? ^S</p> |
| 61 | 2 | <p>Is codling moth managed using mating disruption on 25% of all producing acres? ^D</p> |
| | 31 | <p>Total Points: Pesticide Use and Hazard Reduction</p> |

| Pest Monitoring and Management | | | |
|---|----|--|--|
| 62 | 1 | | If weeds are targeted with herbicides, are they scouted at least once per season and documented to indicate species and location, e.g., tree row or row middle? ^D |
| 63 | 1 | | Are mite thresholds adjusted upwards based on varietal susceptibility, current or anticipated weather, or other factors reducing potential for economic injury? ^S |
| 64 | 1 | | Are air temperature, average wind speed and direction during application documented on spray records? ^D |
| 65 | 3 | | Is the Cornell Apple Carbohydrate Thinning Model (newa.cornell.edu/index.php?page=apple-thin) used for thinning and crop load management? ^S |
| 66 | 3 | | Is the Predicting Fruitset Model (msue.anr.msu.edu/topic/apples/horticulture) used for thinning and crop load management? ^S |
| 67 | 1 | | Is a regional Network for Environment and Weather Applications (NEWA) station used for pest and disease management, newa.cornell.edu ? ^D |
| 68 | 1 | | Are Maryblyt or CougarBlight used before making any antibiotic applications for fire blight? ^D |
| 69 | 1 | | Do spray records include pesticide cost per acre for all applications? ^D |
| | 12 | | Total Points: Pest Monitoring and Management |
| Orchard Floor, Weed and Alternate-Host Management | | | |
| 70 | 1 | | Are weeds in tree rows managed without herbicides (cultivation, aeration, mulching, over-seeding)? ^D |
| 71 | 1 | | Are weeds in alleyways and row middles managed without herbicides (cover cropping, cultivation, aeration, over-seeding)? ^D |
| 72 | 1 | | Are slow-growing species of ground cover planted to reduce mowing requirements? ^S |

| | | | |
|----|----|--|---|
| 73 | 1 | | Is a buffer of non-blooming plants \geq 60 feet maintained around all fields that receive pesticides toxic to pollinators? ^S Note: The Xerces Society recommends a minimum buffer of 125 feet from crops treated with neonicotinoids and 60 feet from all pesticides applied with an airblast sprayer, to protect pollinators, xerces.org/wp-content/uploads/2016/10/ProtectingHabitatFromPesticideContamination_oct2016-02.pdf . |
| 74 | 1 | | Are bases of trunks kept weed-free to reduce burr knot growth and environments attractive to borer species? ^S |
| 75 | 1 | | Is blooming groundcover reduced to protect foraging pollinators? ^S Note: Practice recognizes mowing or herbicide applications which target broadleaf weeds in drive rows and row middles or noxious weeds anywhere in the field, mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist.aspx ^S |
| 76 | 1 | | Is the orchard groundcover managed to eliminate alternate hosts for tarnished plant bug, e.g., winter-annual weeds, chickweeds, dandelion, clovers, vetch and other legumes? ^S |
| 77 | 2 | | Are wild apple trees removed from adjoining fields, borders and woods? ^S |
| 78 | 2 | | Are brambles, wild hosts of sooty blotch and flyspeck, removed from adjoining fields, borders and woods? ^S |
| | 11 | | Total Points: Orchard Floor, Weed and Alternate-Host Management |

| Grower Education and Self-Improvement | | | |
|--|----------|--|---|
| 79 | 1 | | Has a field day or other production-related educational meeting been hosted on the farm within the last three years? List date and name/description of event: ^D |
| 80 | 3 | | Has on-farm research been conducted using control (untreated) trees for comparison within the last three years? List subject of research and dates: ^D |
| 81 | 2 | | Do you belong to a state and/or regional grower organization, in addition to participation in Truearth Certified? List organizations: ^D |
| 82 | 2 | | Have you attended one or more educational meetings in addition to the Truearth Certified Annual Meeting within the last year? List meetings: ^D |
| | 8 | | Total Points: Grower Education and Self-Improvement |
| Energy and Waste Conservation | | | |
| 83 | 1 | | Is energy efficient lighting used in the office, packing and storage facilities? ^S |
| 84 | 1 | | Is storage energy conserved through energy efficiency improvements to buildings, cooling pumps and compressors in cold storage? Please describe, attach additional sheets if necessary. Note: Points may be awarded for the life of the improvement. ^S |
| 85 | 2 | | Are tractors operated in economy mode when appropriate? Note: Economy modes reduce engine operating RPM while maintaining the PTO at 540 RPM. ^S |

| | | | |
|---|-----|--|--|
| Practice 93 to 100 apply to the field, packing, storage, office and maintenance facilities on the farm. Take credit if at least 90% of the resource is recycled. | | | |
| 86 | .25 | | Are paper and cardboard recycled? ^S |
| 87 | .25 | | Is plastic recycled? ^S |
| 88 | .25 | | Is aluminum recycled? ^S |
| 89 | .25 | | Is glass recycled? ^S |
| 90 | .25 | | Are used pesticide containers, where consistent with regulations, recycled? ^S |
| 91 | .25 | | Are batteries recycled? ^S |
| | 5.5 | | Total Points: Energy and Waste Conservation |
| Food Safety and Product Quality | | | |
| 92 | 2 | | Are harvesting bins and storage rooms sanitized annually after storage and packing are completed? ^S |
| 93 | 4 | | Does the farm have a valid USDA GAP, Global Food Safety Initiative GLOBALG.A.P. or PrimusGFS certification? ^S For more information visit: mygfsi.com/schemes-certification/recognised-schemes.html . |
| 94 | 2 | | Are orchard blocks fenced in to prevent wildlife and livestock from browsing/grazing in orchards? ^S |
| 95 | 2 | | Is irrigation water tested in accordance with the FDA Food Safety Modernization Act agriculture water requirement? ^S Note: This practice is not required or enforceable by the FDA at this time. The first water test is proposed to take effect in 2022 for small farms. ^S |
| | 10 | | Total Points: Food Safety and Product Quality |

| SCORE CARD | <i>Points eligible</i> | <i>Points earned</i> |
|--|------------------------|----------------------|
| Growers in the program more than one season must earn a total of at least 28 points for each block. First year growers must earn at least 20 points for each block. | | |
| Total Points: Soil and Water Conservation | 11 | |
| Total Points: Pesticide Use and Hazard Reduction | 31 | |
| Total Points: Pest Monitoring and Management | 12 | |
| Total Points: Orchard Floor, Weed and Alternate-Host Management | 11 | |
| Total Points: Grower Education and Self-Improvement | 8 | |
| Total Points: Energy and Waste Conservation | 5.5 | |
| Total Points: Food Safety and Product Quality | 10 | |
| Total Score (add columns, include total for all sections) | 88.5 | |

III. Pesticide Hazard and Risk Ranking

The following practices and products are listed for Midwest fruit production. Pesticide active ingredients have been evaluated for necessity to produce quality apples in the Midwest 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.

Only fungicides, herbicides and insecticides which have been evaluated against our criteria and appear on the list of approved pesticides may be applied on enrolled blocks. If a fungicide, herbicide or insecticide is not included, please contact the IPM Institute to request a product evaluation. The IPM Institute will confirm receipt of requests within one business day and respond with a resolution within one to three business days.

Note: Pesticides have been evaluated using formulated-active ingredients and differences in product formulation do impact acute risk. If pesticides with other trade names are used, they should have similar signal word (caution, warning), percent active ingredient and product formulation, e.g., wettable powder (WP), water-dispersible granule (WDG) or suspension concentrate (SC). **If a similarly formulated product is not available, please contact the IPM Institute to make an exemption request prior to application.**

Pesticide hazards were analyzed using the database at pesticideinfo.org, 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 Pesticide Risk Tool (pesticiderisk.org) and Windows Pesticide Screening Tool, WIN-PST (go.usa.gov/Kok), have also been used to evaluate pesticide risks.

The following criteria were used to evaluate pesticides:

Acute toxicity to wildlife, fish, aquatic invertebrates: Product label, Pesticide Risk Tool

Acute toxicity: CAUTION, WARNING or DANGER Label/US EPA, Pesticide Risk Tool

Neurotoxin: Cholinesterase inhibitor or listed on Toxics Reduction Inventory maintained by US EPA

Possible, likely, probable carcinogen: US EPA, State of California, and International Agency for Research on Cancer

Reproductive/developmental toxin: US EPA, State of California, Pesticide Risk Tool

Toxic to pollinators, key natural enemies/secondary pests: Product label, Extension recommendations, variety of published sources

Toxic to wildlife: Product label, Pesticide Risk Tool

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 thousands of pesticides labeled for use on specialty crops in the United States. 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 “Low-Risk Pesticides, No Restrictions” or “Moderate to High-Risk Pesticides, No Restrictions” category. For example, for most products, acute toxicity to applicators is readily addressed by following label requirements for personal protective equipment. **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 which are needed to address a key pest are then moved to the “Use with Restrictions (Moderate to High-Risk Pesticides)” 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 (Moderate to High-Risk Pesticides)” category 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, and development of resistance is a concern if available modes of action are limited. We don’t know for 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 the IPM Institute of North America, Inc. and the Truearth Program is owned by Wescott Agri Products. The IPM Institute makes final decisions on protocol content.
- h. A timeline for new products that do not have approved labels by the annual meeting will be provided, e.g., mid-season product releases. These products will be listed under their appropriate use category as per the review process and will include anticipated release date. **Products may not be used until a label has been approved for the state in which they will be used.** Applications made prior to the label approval date will be considered a protocol violation and result in disqualification of the blocks which received treatment.

Pesticide Use Restrictions

IMPORTANT: All of the following products may not be registered in every state. Please confirm the product is labeled for use in your state!

LOW-RISK PESTICIDES, NO RESTRICTIONS BEYOND THOSE ON THE PRODUCT LABEL

1. These pesticides may be used to the full extent of the pesticide label and pose minimal risk to environmental and human health.
2. Use only after systematic scouting or weather monitoring and science-based thresholds, or according to previous history where thresholds are not available.
3. Pesticides included are not a guarantee of efficacy. Some products will not be as effective as other products against specific target pests.

| Trade Name | Active Ingredient | Concerns | Best Practice |
|---|---------------------------------------|----------|---|
| Insect/Mite Management | | | |
| Cyd-X, Virosoft, Madex HP | <i>Cydia pomonella</i> granulovirus | | |
| Mating disruption, e.g., CheckMate, IsoMate | 1-dodecanol, 1-tetradecanol | | Available for codling moth and oriental fruit moth. |
| Nealta | cyflumetofen | | |
| PFR-97 | <i>Isaria fumosorosea</i> | | |
| Surround | kaolin | | May be prior to trap catches based on historical scouting data or insect model. |
| Venerate | <i>Burkholderia</i> spp. | | |
| Disease Management | | | |
| Actigard 50WG | acibenzolar-s-methyl | | |
| Blossom Protect | <i>Aureobasidium pullulans</i> | | |
| Double Nickel | <i>Bacillus amyloliquefaciens</i> | | |
| Lifegard WG | <i>Bacillus mycooides</i> | | |
| Regalia | <i>Reynoutria sachalinensis</i> | | |
| Serenade | <i>Bacillus subtilis</i> | | |
| Urea | urea | | |
| Weed Management | | | |
| Avenger AG | d-limonene | | |
| Other | | | |
| Apogee | prohexadione calcium | | |
| Blush | prohydrojasmon | | |
| Exilis, MaxCel, Promalin | benzyladenine | | |
| Fruitone | 1-naphthaleneacetic acid | | |
| Plantskydd | blood meal | | |
| Retain | aminoethoxyvinylglycine hydrochloride | | |
| SmartFresh, Harvista | 1-methylcyclopropene | | |

MODERATE to HIGH-RISK PESTICIDES, NO RESTRICTIONS BEYOND THOSE ON THE PRODUCT LABEL

1. These pesticides may be used to the full extent of the pesticide label. Moderate to high risks to environmental and human health are present.
2. Use only after systematic scouting or weather monitoring and science-based thresholds, or according to previous history where thresholds are not available.
3. Pesticides included are not a guarantee of efficacy. Some products will not be as effective as other products against specific target pests.

| Trade Name | Active Ingredient | Concerns | Best Practice |
|-------------------------------|----------------------------------|--|--|
| Insect/Mite Management | | | |
| Acramite 50 WS | bifenazate | toxic to bees | |
| Avaunt | indoxacarb | toxic to mammals, birds, fish, aquatic invertebrates, highly toxic to bees | |
| Aza-Direct, Neemix | azadirachtin | toxic to bees, suspected endocrine disruptor, toxic to fish and aquatic invertebrates | |
| Agree, Deliver, Dipel | <i>Bacillus thuringiensis</i> | runoff risk to surface water | |
| Beleaf 50 | flonicamid | potential groundwater contaminant | |
| Centaur WDG | buprofezin | potential groundwater contaminant | |
| Closer SC | sulfoxaflor | highly toxic to bees and earthworms | IRAC 4C neonicotinoid. |
| Damoil | mineral oil | toxic to fish | Performance is best when relative humidity is less than 65% and temperatures are warmer than 60°F. |
| Entrust | spinosad | toxic to bees | |
| Envidor 2 SC | spirodiclofen | toxic to fish and aquatic invertebrates, toxic to bees | |
| Esteem 35 WP | pyriproxyfen | toxic to fish and aquatic invertebrates | |
| Portal | fenpyroximate | highly toxic to fish and aquatic invertebrates | |
| Grandevo | <i>Chromobacterium subtsugae</i> | toxic to aquatic invertebrates | |
| Intrepid 2F | methoxyfenozide | hazardous to aquatic invertebrates, potential groundwater contaminant | |
| Kanemite 15 SC | acequinocyl | toxic to aquatic invertebrates | |
| Movento | spirotetramat | toxic to aquatic invertebrates and oysters, potential groundwater contaminant, potentially toxic to honey bee larvae | |
| PyGanic EC | pyrethrins | toxic to aquatic invertebrates and beneficials, highly toxic to bees | |
| Sivanto Prime | flupyradifurone | toxic to aquatic invertebrates, potential groundwater contaminant | IRAC 4D neonicotinoid. |
| Zeal WP | etoxazole | toxic to aquatic invertebrates | |

| MODERATE to HIGH-RISK PESTICIDES, NO RESTRICTIONS BEYOND THOSE ON THE PRODUCT LABEL | | | |
|--|------------------------------------|--|--|
| Trade Name | Active Ingredient | Concerns | Best Practice |
| Disease Management | | | |
| Captan | captan | acute toxicity to workers, toxic to fish, carcinogen under prolonged exposure to high doses | <ol style="list-style-type: none"> 1. Tank mixtures not recommended between petal fall and first cover to reduce risk of fruit russeting. 2. Use CAUTION or WARNING labels where possible. |
| C-O-C-S | copper oxychloride, copper sulfate | toxic to fish and aquatic invertebrates | |
| Cueva | copper octanoate | leaching risk to ground and surface water | |
| Cuprofix Ultra 40 Disperss | copper sulfate | toxic to bees | |
| Flowable Sulfur | sulfur | toxic to small mammals and fish | |
| Lime-Sulfur Solution | calcium polysulfide | toxic to birds, surface water contaminant | |
| Penncozeb, Manzate, Dithane | mancozeb, maneb | probable carcinogen, developmental toxin, suspected endocrine disruptor, acute aquatic toxicity | <ol style="list-style-type: none"> 1. Selecting mancozeb reduces the high-inhalation risk associated with metiram. 2. Avoid applying EBDCs after bloom to preserve mite predators |
| Polyram 80 DF | metiram | probable carcinogen, developmental toxin, suspected endocrine disruptor, acute aquatic toxicity | Avoid applying EBDCs after bloom to preserve mite predators |
| Phostrol, Reliant | phosphorus acid | toxic to fish, surface water contaminant | |
| ProPhyt | potassium phosphite | toxic to fish, surface water contaminant | |
| Scholar SC | fludioxonil | toxic to fish and aquatic invertebrates | |
| Syllit FL | dodine | acute toxicity to workers, resistance | Do not use where resistance is suspected. |
| Topsin | thiophanate-methyl | likely carcinogen, reproductive/developmental toxin, potential groundwater contaminant, resistance | Use only where history of summer disease. |
| Vanguard WG | cyprodinil | toxic to fish and aquatic invertebrates, potential groundwater contaminant | Recommended for using during cool and wet weather. |

| MODERATE to HIGH-RISK PESTICIDES, NO RESTRICTIONS BEYOND THOSE ON THE PRODUCT LABEL | | | |
|--|--------------------------|---|---|
| Trade Name | Active Ingredient | Concerns | Best Practice |
| Weed Management | | | |
| Aim EC | carfentrazone-ethyl | acute toxicity to wildlife, fish, aquatic invertebrates | May also be used for control of root suckers. |
| Alion | indaziflam | acute toxicity to wildlife, fish, aquatic invertebrates, potential/ known groundwater contaminant | |
| Chateau | flumioxazin | toxic to aquatic invertebrates | |
| Fusilade DX | fluazifop-P-butyl | toxic to fish, possible reproductive/developmental toxin | |
| Matrix | rimsulfuron | potential groundwater contaminant | |
| Poast Herbicide | sethoxydim | potential groundwater contaminant | |
| Prowl H2O | pendimethalin | possible carcinogen, suspected endocrine disruptor, moderate aquatic toxicity | |
| Rely | glufosinate-ammonium | moderate risk bird reproductive | |
| Roundup, Cornerstone, Makaze, Credit | glyphosate | resistance, surface water contaminant, probable carcinogen | May cause tree injury if applied after July 1 st . |
| Sandea | halosulfuron-methyl | possible carcinogen, moderate aquatic toxicity | |
| Scythe | pelargonic acid | acute toxicity to workers | |
| Starane Ultra | fluroxypyr-methyl | toxic to fish | Must have supplemental label. |
| Stinger | clopyralid | potential groundwater contaminant, resistance | |
| Treevix | saflufenacil | potential surface and groundwater contaminant | |
| Venue | pyraflufen-ethyl | moderate aquatic toxicity, potential groundwater contaminant | |
| Other | | | |
| Amid-Thin W | 1-naphthaleneacetamide | high acute toxicity to workers | |

USE WITH RESTRICTIONS (MODERATE to HIGH-RISK PESTICIDES), RESTRICTIONS WHICH EXCEED THE PRODUCT LABEL

1. These pesticides have additional restrictions which supersede the pesticide label to mitigate moderate to high risks to environmental and human health.
2. Use with justification and only when less hazardous alternatives (e.g., those listed above) are not adequate.
3. Use only after systematic scouting or weather monitoring and science-based thresholds, or according to previous history where thresholds are not available.
4. Pesticides included are not a guarantee of efficacy. Some products will not be as effective as other products against specific target pests.

| Trade Name | Active Ingredient | Concerns | Truearth Restrictions | Best Practice |
|---|---------------------|---|--|--|
| Insect/Mite Management | | | | |
| Insecticide-coated apple maggot spheres | | | Insecticide-coated spheres may only be used through participation in Extension or United States Department of Agriculture research. | |
| Altacor | chlorantraniliprole | toxic to aquatic organisms and certain beneficials, potential groundwater contaminant | Do not expose more than one generation of the target pest to this mode of action alone. | |
| Delegate WG | spinetoram | toxic to bees, toxic to aquatic invertebrates | Do not expose more than one generation of the target pest to this mode of action alone. | |
| Exirel | cyantraniliprole | highly toxic to bees, toxic to aquatic invertebrates, potential groundwater contaminant | <ol style="list-style-type: none"> 1. Do not apply until after bloom. 2. Do not expose more than one generation of the target pest to this mode of action alone. | |
| Lorsban | chlorpyrifos | moderate acute toxicity to workers, cholinesterase inhibitor, suspected endocrine disruptor, broad spectrum, highly toxic to bees | <ol style="list-style-type: none"> 1. Use for trunk borer species only. 2. Apply only as a trunk spray. To avoid contact with fruit, apply when fruit are not present. If fruit are present, do not apply using lower nozzles of an airblast sprayer; use a hand wand, shielded sprayer or other method where drift onto fruit can be avoided. | Some growers have reported using an herbicide sprayer that has been carefully cleaned prior to the trunk application. There are a number of issues that should be carefully considered before using this strategy, see extension.missouri.edu/p/G4852 for some of these. |
| Versys | afidopyropen | Toxic to bees, acute-aquatic toxicity | Do not apply until after bloom. | |

| USE WITH RESTRICTIONS (MODERATE to HIGH-RISK PESTICIDES), RESTRICTIONS WHICH EXCEED THE PRODUCT LABEL | | | | |
|---|----------------------|---|--|--|
| Trade Name | Active Ingredient | Concerns | Truearth Restrictions | Best Practice |
| Insect/Mite Management | | | | |
| Neonicotinoids | | | | |
| Actara | thiamethoxam | toxic to wildlife, highly toxic to aquatic invertebrates, highly toxic to bees, potential groundwater contaminant | 1. Do not apply until after bloom. 2. Do not expose more than one generation of the target pest to this mode of action alone. | These are IRAC 4A neonicotinoids. Rotation between applications of 4C (Closer, sulfoxaflor) and 4D (Sivanto prime, flupyradifurone) neonicotinoids may not provide adequate resistance management. |
| Assail | acetamiprid | toxic to wildlife, toxic to bees, may result in spider mite flare up, potential groundwater contaminant | Do not expose more than one generation of the target pest to this mode of action alone. | |
| Belay | clothianidin | toxic to aquatic invertebrates, highly toxic to bees, potential groundwater contaminant | 1. Do not apply until after bloom. 2. Do not expose more than one generation of the target pest to this mode of action alone. | |
| Admire Pro, Alias, Montana | imidacloprid | toxic to aquatic invertebrates, toxic to bees, toxic to earthworms, toxic to wildlife | 1. Do not apply until after bloom. 2. Do not expose more than one generation of the target pest to this mode of action alone. | |
| Disease Management | | | | |
| Agri-Mycin 17, FireWall | streptomycin sulfate | | After bloom, apply only following hail or wind damage in orchards with existing infections. <i>Post-bloom application is also allowed for blister spot on susceptible varieties, e.g., Crispin, Mutsu.</i> | Apply only for fire blight according to a weather-based forecasting program, e.g., Maryblyt or CougarBlight. |
| Kasumin | kasugamycin | | After bloom, apply only following hail or wind damage in orchards with existing infections. | Apply only for fire blight according to a weather-based forecasting program, e.g., Maryblyt or CougarBlight. |

| USE WITH RESTRICTIONS (MODERATE to HIGH-RISK PESTICIDES), RESTRICTIONS WHICH EXCEED THE PRODUCT LABEL | | | | |
|--|---|--|--|---|
| Trade Name | Active Ingredient | Concerns | Truearth Restrictions | Best Practice |
| Disease Management | | | | |
| Badge SC Badge X2 | copper hydroxide, copper oxychloride | acute toxicity to workers, toxic to fish and aquatic invertebrates, toxic to bees | Badge SC: Use CAUTION label formulation only. Badge X2: Use WARNING label formulation only. | |
| Champ, Kocide | copper hydroxide | acute toxicity to workers, toxic to fish and aquatic invertebrates, toxic to bees | Use CAUTION or WARNING label formulations only. | |
| SDHIs | | | | |
| Aprovia | benzovindiflupyr | acute toxicity to workers, resistance | 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | Apply before apple-scab infections to delay resistance. |
| Fontelis | penthiopyrad | suspected carcinogen, reproductive/ developmental toxin | 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | 1. Apply before apple-scab infections to delay resistance. 2. Tank mixes of captan and Fontelis have been phytotoxic to foliage. 3. Do not tank mix with thinning agents. |
| Luna Sensation | fluopyram, trifloxystrobin | possible carcinogen, developmental and reproductive toxin | 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | 1. Apply before apple-scab infections to delay resistance. 2. Recommended to tank mix with captan if bitter rot is evident on some fruit in the orchard. |
| Merivon | fluxapyroxad, pyraclostrobin | potential groundwater contaminant | 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | 1. Apply before apple-scab infections to delay resistance. 2. Recommended to tank mix with captan if bitter rot is evident on some fruit in the orchard. |

| USE WITH RESTRICTIONS (MODERATE to HIGH-RISK PESTICIDES), RESTRICTIONS WHICH EXCEED THE PRODUCT LABEL | | | | |
|--|----------------------------|--|--|---|
| Trade Name | Active Ingredient | Concerns | Truearth Restrictions | Best Practice |
| Disease Management | | | | |
| Strobilurins (Qols) | | | | |
| Flint | trifloxystrobin | toxic to fish and aquatic invertebrates, possible carcinogen, resistance | <ol style="list-style-type: none"> 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | Recommended to tank mix with captan if bitter rot is evident on some fruit in the orchard. |
| Pristine | boscalid, pyraclostrobin | possible carcinogen, toxic to fish and aquatic invertebrates | <ol style="list-style-type: none"> 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | <ol style="list-style-type: none"> 1. Use only in rotation with a different mode of action. 2. Do not use back-to-back applications. 3. Recommended to tank mix with captan if bitter rot is evident on some fruit in the orchard. |
| Sovran | kresoxim-methyl | likely carcinogen, suspected groundwater contaminant | <ol style="list-style-type: none"> 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | Recommended to tank mix with captan if bitter rot is evident on some fruit in the orchard. |
| Sterol inhibitors (DMIs) | | | | |
| Indar 2F | fenbuconazole | toxic to fish, aquatic invertebrates, algae, EPA possible carcinogen related to crystalline silica content, reproductive effects on female animals | <ol style="list-style-type: none"> 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | Do not use where resistance is known. |
| Inspire Super | cyprodinil, difenoconazole | possible carcinogen, suspected endocrine disruptor, potential groundwater contaminant | <ol style="list-style-type: none"> 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | Do not use where resistance is known. |

| USE WITH RESTRICTIONS (MODERATE to HIGH-RISK PESTICIDES), RESTRICTIONS WHICH EXCEED THE PRODUCT LABEL | | | | |
|--|--------------------------|--|--|---------------------------------------|
| Trade Name | Active Ingredient | Concerns | Truearth Restrictions | Best Practice |
| Disease Management | | | | |
| Sterol inhibitors (DMIs) | | | | |
| Rubigan EC | fenarimol | suspected endocrine disruptor, resistance | <ol style="list-style-type: none"> 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | Do not use where resistance is known. |
| Procure 480 SC, Trionic 4 SC | triflumizole | acute aquatic toxicity, potential groundwater contaminant, resistance | <ol style="list-style-type: none"> 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | Do not use where resistance is known. |
| Rally 40 WSP | myclobutanil | developmental/ reproductive toxicity, acute aquatic toxicity, resistance | <ol style="list-style-type: none"> 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | Do not use where resistance is known. |
| Topguard Specialty | flutriafol | suspected endocrine disruptor, potential groundwater contaminant | <ol style="list-style-type: none"> 1. Must be tank mixed with a protectant fungicide. 2. May be used alone within 30 days of harvest, however, must be tank mixed with a protectant if active scab lesions are present at time of application. | Do not use where resistance is known. |

| USE WITH RESTRICTIONS (MODERATE to HIGH-RISK PESTICIDES), RESTRICTIONS WHICH EXCEED THE PRODUCT LABEL | | | | |
|--|--------------------------|---|--|----------------------|
| Trade Name | Active Ingredient | Concerns | Truearth Restrictions | Best Practice |
| Weed Management | | | | |
| Gramoxone | paraquat dichloride | acute toxicity to workers, potential groundwater contaminant, moderate aquatic toxicity | Must be applied using a tractor with an enclosed cab. | |
| Select (CAUTION label) | clethodim | potential groundwater contaminant | Use CAUTION label formulations only. | |
| Sinbar | terbacil | developmental toxin, potential groundwater contaminant | Limited to one application per season | |
| 2,4-D | 2,4-D | acute toxicity to workers, possible carcinogen | Application restrictions vary between labels | |
| Other | | | | |
| DPA, No Scald, Shield | diphenylamine | acute toxicity to workers | <ol style="list-style-type: none"> 1. CAUTION label formulations may be used as drenches, sprays, flooding, fogging or aerosol. 2. DANGER label formulations may only be used as fogging or aerosol by custom applicators. | |
| Ethephon | ethephon | toxic to bees, toxic to earthworms | <ol style="list-style-type: none"> 1. May be used for return bloom or thinning. 2. Use for fruit ripening only when directed by the packing house. | |
| Sevin | carbaryl | extremely toxic to aquatic invertebrates, highly toxic to bees | Apply for fruit thinning only. | |

| DO NOT USE | | |
|-------------------------------|---------------------------|--|
| Trade Name | Active Ingredient | Concerns |
| Insect/Mite Management | | |
| Agri-Mek, Abba, Temprano | abamectin | acute toxicity to workers, developmental toxin and acute aquatic toxicity, highly toxic to bees |
| Ambush, Pounce | permethrin | acute toxicity to workers, toxicity to beneficials, possible carcinogen, suspected endocrine disruptor, acute aquatic toxicity, highly toxic to bees, broad spectrum |
| Apollo | clofentezine | possible carcinogen, suspected endocrine disruptor |
| Apta | tolfenpyrad | highly toxic to fish and aquatic invertebrates, highly toxic bees |
| Asana XL | esfenvalerate | extremely toxic to fish and aquatic invertebrates, highly toxic to bees, toxicity to beneficials, suspected endocrine disruptor |
| Imidan 70-W | phosmet | acute toxicity to workers, cholinesterase inhibitor and broad spectrum, highly toxic to bees |
| Nexter | pyridaben | acute toxicity to workers, acute aquatic toxicity, highly toxic to bees |
| Proclaim | emamectin benzoate | toxic to fish, birds, mammals and aquatic invertebrates, Restricted Use Pesticide |
| Rimon 0.83 EC | novaluron | acute toxicity to freshwater and estuarine/marine invertebrates and fish, runoff potential – especially in poorly drained soils and toxic to bees |
| Savey 50 DF, Onager | hexythiazox | possible carcinogen, moderate aquatic toxicity |
| Tourismo | buprofezin, flubendiamide | groundwater contaminant, possible carcinogen |
| Vydate L | oxamyl | acute toxicity to workers, broad spectrum, highly toxic to bees |

| DO NOT USE | | |
|--------------------------------|---|---|
| Trade Name | Active Ingredient | Concerns |
| Disease Management | | |
| Badge X2 (DANGER label) | copper hydroxide, copper oxychloride | acute toxicity to workers, toxic to fish and aquatic invertebrates, toxic to bees |
| Champ WG (DANGER label) | copper hydroxide | acute toxicity to workers, toxic to fish and aquatic invertebrates, toxic to bees |
| Ferbam | ferbam | acute aquatic toxicity |
| Luna Tranquility | pyrimethanil, fluopyram | possible carcinogen, developmental and reproductive toxin |
| Mankocide (DANGER label) | copper hydroxide, mancozeb | acute toxicity to workers, toxic to fish and aquatic invertebrates, toxic to bees, earthworms, probable carcinogen, developmental toxin, suspected endocrine disruptor, acute aquatic toxicity |
| Mertect 340-F | thiabendazole | possible carcinogen, developmental toxin |
| Omega 500F | fluazinam | toxic to fish and aquatic invertebrates, possible carcinogen |
| Ridomil Gold SL | mefenoxam | acute aquatic toxicity |
| Scala SC, Penbotec | pyrimethanil | possible carcinogen and suspected endocrine disruptor |
| Thiram Granuflo | thiram | reproductive/developmental toxin, suspected endocrine disruptor |
| Ziram 76 DF | ziram | acute toxicity to workers, likely carcinogen, developmental/reproductive toxin and suspected endocrine disruptor |
| Weed Management | | |
| Casoron 4G | dichlobenil | possible carcinogen, potential groundwater contaminant, moderate aquatic toxicity |
| Diquat SPC 2L | diquat dibromide | potential groundwater contaminant, moderate aquatic toxicity |
| Direx 4L, Karmex DF | diuron | known carcinogen, developmental toxin, acute aquatic toxicity, toxic to birds, potential ground and surface water contaminant |
| Gallery 75 DF | isoxaben | possible carcinogen, potential groundwater contaminant, moderate aquatic toxicity |
| GoalTender | oxyfluorfen | possible carcinogen, acute aquatic toxicity |
| Kerb | propyzamide | probable carcinogen, potential groundwater contaminant, moderate aquatic toxicity |
| Select 2 EC (WARNING label) | clethodim | acute toxicity to workers, potential groundwater contaminant |
| Simazine 4L | simazine | possible carcinogen, reproductive toxin, known groundwater contaminant, acute aquatic toxicity |
| Solicam DF | norflurazon | possible carcinogen, known groundwater contaminant, moderate aquatic toxicity |
| Surflan AS | oryzalin | likely carcinogen, potential groundwater contaminant, acute aquatic toxicity |

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V. Revisions to the 2019 edition

1. Note added to minimum requirements practice #1, Food Safety Modernization Act (FSMA) requirements are followed www.fda.gov/downloads/Food/GuidanceRegulation/FSMA/UCM472887.pdf, pg. 6.
2. The reference guide to the practice, “Does mode of action rotate between each application of an herbicide?”, has been updated to include, “Back-to-back applications of the same mode of action are permitted where consistent with the product label or Extension recommendations”, practice 18, pg. 9.
3. The reference guide to the practice, “Are herbicide applications limited to three per season on the same application site?”, has been updated to include, “If adequate control is not achieved, a fourth herbicide application may be applied. Application must be supported with documentation identifying weed species that were not controlled during previous applications”, practice 19, pg. 9.
4. Advanced practice #37 updated: Is an NRCS approved Environmental Quality Incentives Program (EQIP) or Conservation Stewardship Program (CSP) contract in place for any of the following conservation-practice standards: IPM (595), IPM Conservation Activity Plan (114), Pollinator Habitat Plan (146), Conservation Cover – Pollinator Species (327), Cover Crop (340), Field Border – Pollinator Species (386), Upland Wildlife Habitat Management – Honeybee or Monarch (Milkweed inter-seeding) (645)?, pg. 11.
5. New advanced practice #43: Are herbicides with high risks to water quality avoided? ^D

Note: Applying these high-risk products will not receive credit for this practice: Gramoxone (paraquat-dichloride), Prowl H20 (pendimethalin), Starane Ultra (fluroxypyr-methyl) and Venue (pyraflufen-ethyl). The Pesticide Risk Tool and Windows Pesticide Screening Tool (WIN-PST) were used to identify high risks relating to water quality and aquatic life, pg. 12.

6. New advanced practice #44: Are insecticides which pose high risks to pollinators from drift or foraging pollinators within the orchard avoided? ^D

Note: Applying these high-risk products will not receive credit for this practice: Actara (thiamethoxam), Alias/Montana/Wrangler (imidacloprid), Belay (clothianidin), Entrust (spinosad) and Lorsban (chlorpyrifos). None of these products are applied to receive credit for this practice. The Pesticide Risk Tool was used to identify high risks to pollinators, pg. 12.

7. Advanced practice #59 updated: Are fallen fruit removed from beneath trees in blocks where bitter rot is an annual problem, after June drop and hand thinning, or in the fall after harvest?, pg. 13.
8. New advanced practice #70: Are weeds in tree rows managed without herbicides (cultivation, aeration, mulching, over-seeding)? ^D, pg. 14
9. New advanced practice #71: Are weeds in alleyways and row middles managed without herbicides (cover cropping, cultivation, aeration, over-seeding)? ^D, pg. 14.

10. Note added to advanced practice #73: Is a buffer of non-blooming plants \geq 60 feet maintained around all fields that receive pesticides toxic to pollinators?

Note: The Xerces Society recommends a minimum buffer of 125 feet from crops treated with neonicotinoids and 60 feet from all pesticides applied with an airblast sprayer, to protect pollinators, xerces.org/wp-content/uploads/2016/10/ProtectingHabitatFromPesticideContamination_oct2016-02.pdf, pg. 15.

11. Advanced practice #75 updated: Is blooming groundcover reduced to protect foraging pollinators?

Note: Practice recognizes mowing or herbicide applications which target broadleaf weeds in drive rows and row middles or noxious weeds anywhere in the field, mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist.aspx ^s, pg. 15.

12. New advanced practice #77: Are wild apple trees removed from adjoining fields, borders and woods? ^s, pg. 15.

13. New advanced practice #78: Are brambles, wild hosts of sooty blotch and flyspeck, removed from adjoining fields, borders and woods? ^s, pg. 15.

14. Minimum requirement for FSMA irrigation-water testing moved to advanced practice #95: Is irrigation water tested in accordance with the FDA Food Safety Modernization Act agriculture water requirement?, pg. 17.

Note: This practice is not required or enforceable by the FDA at this time. The first water test is proposed to take effect in 2022 for small farms.

15. The reference guide to the practice “Are pesticide and nutrient application equipment calibrated according to the manufacturer’s instructions, at least annually?”, has been clarified, “Spray control systems including GPS and flow meters are calibrated during initial installation and inspected annually for maintenance needs and recalibrated when necessary, e.g., after parts replacement”, practice 8, pg. 7.

16. The following advanced practices have been removed from the protocol:

| Old practice | Rationale for protocol change |
|--|--|
| Are treatments of Surround (kaolin) made before expected apple maggot oviposition? | <ul style="list-style-type: none"> - Wescott Agri Products does not want growers applying kaolin. - Lack of practice adoption. |
| Are treatments of Surround (kaolin) made before expected plum curculio oviposition (two sprays seven days apart)? | <ul style="list-style-type: none"> - Wescott Agri Products does not want growers applying kaolin. - Lack of practice adoption. |
| Is apple maggot controlled without pesticide sprays, e.g., by trap out? | <ul style="list-style-type: none"> - Lack of practice adoption. - Growers believe practice is too risky/not practical at commercial scale. |
| Is Potential Ascospore Dose (PAD) assessed by systematic fall scouting and scab management is adjusted as per results? | <ul style="list-style-type: none"> - Practice is not practical since growers are not using protectant only fungicide programs. |
| Are herbicides not used in alleyways and row middles (drive rows)? | <ul style="list-style-type: none"> - Practice replaced with: Are weeds in tree rows managed without herbicides (cultivation, aeration, mulching, over-seeding)?, #70, pg. 14. |
| Are herbicides not used in tree rows? | <ul style="list-style-type: none"> - Practice replaced with: Are weeds in alleyways and row middles managed without herbicides (cover cropping, cultivation, aeration, over-seeding)?, #71, pg. 14. |
| Are noxious weeds attractive to pollinators removed from fields and field borders? | <ul style="list-style-type: none"> - Note on noxious weeds added to: Is blooming groundcover reduced to protect foraging pollinators?, #75, pg. 15. |
| Are wild hosts of insects and diseases, e.g., wild apple trees and brambles, removed from adjoining fields and field borders? | <ul style="list-style-type: none"> - Practice replaced with: Are wild apple trees removed from adjoining fields, borders and woods?, #77, pg. 15. - Practice replaced with: Are brambles, wild hosts of sooty blotch and flyspeck, removed from adjoining fields, borders and woods?, #78, pg. 15. |
| Do fungicides for apple scab cease within two weeks after primary scab season, as per Extension communications, unless visible infections are found during scouting? | <ul style="list-style-type: none"> - Practice is no longer practical. In addition to managing apple scab, growers continue to use the same fungicide classes for powdery mildew, black rot, bitter rot, sooty blotch and flyspeck. - Protocol practices require these applications to be applied based on scouting, monitoring or disease modeling, #12 – 14, pg. 8. |

| Old practice | Rationale for protocol change |
|--|---|
| Are applications of Topsin (thiophanate-methyl) for summer diseases, avoided to protect earthworms? | <ul style="list-style-type: none"> - This practice does not adequately address earthworm toxicity. Acetamiprid, carbaryl, clothianidin, copper products, imidacloprid, pyraclostrobin, sulfoxaflor all generate high risks to earthworms in the Pesticide Risk Tool. - Earthworm-risk mitigation needs to address all these active ingredients. - Topsin (T-methyl) does not have activity on secondary scab, bitter rot or black rot. Growers are avoiding Topsin, because changing disease pressure requires fungicides with greater efficacy on these other pathogens. |
| Are existing habitat for pollinators and nesting sites identified and protected from drift? | <ul style="list-style-type: none"> - Other protocol practices do a better job at requiring and incentivizing pollinator protection: <ul style="list-style-type: none"> o Minimum requirements for sprayer calibration reduce risk of drift, #8, pg. 7. o Minimum requirements require use of windspeed and direction on spray days to avoid pesticide drift, #9, pg. 8. o Advanced practice: Are non-blooming buffers of ≥ 60 feet maintained around all field borders where pesticides toxic to pollinators are applied?, #73, pg. 15. o New advanced practice: Are insecticides which pose high risks to pollinators from drift or foraging pollinators within the orchard avoided?, #44, pg. 12. |
| Is alternate-row mowing done to preserve beneficials? Note: Only recommended if plant bugs are not economically damaging in orchard. | <ul style="list-style-type: none"> - The intention of alternate-row mowing is to leave grass long that could allow bloom to develop. Many beneficial insects also thrive on the nectar sources that are attractive to pollinators and this practice conflicts with the goal of encouraging pollinator protection by reducing bloom in the orchard floor. |

The following pesticides have been added to the *Pesticide Use Restrictions*:

- **LOW-RISK PESTICIDES, NO RESTRICTIONS BEYOND THOSE ON THE PRODUCT LABEL:**
 - o Lifegard WG (*Bacillus mycoides*), pg. 21.
- **MODERATE to HIGH RISK-PESTICIDES, NO RESTRICTIONS BEYOND THOSE ON THE PRODUCT LABEL:**
 - o Venue (pyraflufen-ethyl), pg. 24.
- **USE WITH RESTRICTIONS (MODERATE to HIGH-RISK PESTICIDES), RESTRICTIONS WHICH EXCEED THE PRODUCT LABEL:**
 - o Versys (afidopyropen), pg. 25.
 - Do not apply until after bloom.
 - o Note added to 'Best Practices' for neonicotinoids: These are IRAC 4A neonicotinoids. Rotation between applications of 4C (Closer, sulfoxaflor) and 4D (Sivanto prime, flupyradifurone) neonicotinoids may not provide adequate resistance management, pg. 26.

VI. Participating Grower Affidavit and Agreement

1. Participating grower certifies that the attached Self-Assessment 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 inspections to verify compliance with program requirements including information provided on the Self-Assessment and use of Truearth Certified packaging and promotional materials.
3. Participating grower agrees that Truearth Certification is approved solely by the IPM Institute of North America, Inc. and if granted, is for one season only and only for product from participating production areas reported in this Self-Assessment and certified by the IPM Institute.
4. Participating grower agrees not to market any product as Truearth Certified apples, including use of Truearth Certified packaging or other Truearth Certified 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 Truearth Certified apples and no packaging or promotional materials bearing Truearth Certified identification will be used. Participant agrees to bear any costs associated with denial of certification including the cost of Truearth Certified 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 Wescott Agri Products of the participating grower or operation.

| | | |
|---------------------------|-----------|------|
| Participating Grower Name | Signature | Date |
|---------------------------|-----------|------|

VII. Submission Checklist

- ___ a. Completed Self-Assessment
- ___ b. Pesticide, fertilizer, thinner and plant-growth regulator application records for blocks to be certified. See page 3 for required information.

The IPM Institute can digitize spray records not submitted in an electronic format. This service will be charged based on an hourly rate for time required for digitization and a final copy of the electronic record will be sent to the grower.

- ___ c. Scouting records for blocks to be certified. See page 3 for required information.
- ___ d. Certification fee. The annual-certification fee is based on the number of acres of apples enrolled in the program and does not cover costs of on-site audits required every three years. Fees for on-site audits are payable to the IPM Institute of North America.

| | |
|-----------------|---------|
| 0 – 9 acres | \$450 |
| 10 – 24 acres | \$550 |
| 25 – 49 acres | \$700 |
| 50 – 99 acres | \$800 |
| 100 – 149 acres | \$1,000 |
| 150 – 199 acres | \$1,200 |
| 200 – 299 acres | \$1,500 |
| ≥ 300 acres | \$2,000 |

Annual certification fee \$_____ with the 2018 Truearth Self-Assessment, pesticide application and scouting records are due by **August 16, 2019**. Final application and scouting records are due by **December 6, 2019**. Payment is accepted by check or credit card. To pay by credit card please visit our secure website, ipminstitute.org/projects/truearth/online-payment/, or call 608 232-1410.

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