Truearth Spray Guide – 2024 GROWING SEASON – 03/20/2024

The Quick Guide serves as a spray guide which highlights approved pesticides on the Truearth Protocol and Self-Assessment based on apple growth stages. All applications should be supported by the IPM program including scouting, trapping, weather, predictive models and using a season-long approach. **It will not be necessary to take action at every growth stage**. This spray guide is not a comprehensive list of all pesticides included in the Truearth protocol. For a comprehensive list of approved products, please consult the Protocol.

CHANGES FOR 2024

- Flint or Flint 50 WG is now labeled as Flint Extra applied at 2.5 – 2.9 fl. oz. per acre, pg. 5, 9, 13 and 14.
- Cidetrak CMDA Meso mating disruption **added** for codling moth and Oriental fruit moth, pg. 8.
- Alias 4F, Montana 4F and Wrangler (imidacloprid) at 1.6 – 3.2 fl. oz./acre **added** on pg. 11, 15.
- Roundup Ultra **replaced** with "Glyphosate-based herbicides (products and rate vary), pg. 17.
- Polyram 80DF (metiram) **removed** from Quick Guide, registration cancelled by US EPA.
- Rubigan EC/Vintage SC **removed** from Quick Guide, registration cancelled by US EPA.

Get the latest version of the *Truearth Protocol and Self-Assessment*, https://ipminstitute.org/projects/truearth

Checklist for Certification	
✓	***Truearth Protocol and Self-Assessment***
	• Cover sheet is completed with grower contact information.
	• Orchard-block list identifying block names, acreage, cultivars and estimated annual production.
	• Grower meets all minimum requirements and provides brief justification for any N/A or Fail.
Documentation of scouting and monitoring activities	
	Scouting and monitoring records include: ☐ Date ☐ Block(s) ☐ Pest scouted and result, e.g., captures per trap, mites per leaf, weather data and degree-day models. ☐ Grower observations including block history with pest or disease.
	• **Mites:** Scouting records include threshold counts for mites, e.g., number of mites per leaf and number of leaves sampled.
	• **Tarnished plant bug:** Trap counts from white sticky boards and blocks exceeding thresholds are documented in scouting reports.
	• **Fire blight:** Monitoring data from Maryblyt or CougarBlight model is included if antibiotics were applied for fire blight.
	• **Plum curculio:** Visual scouting for plum curculio damage is documented.
	• **Codling moth:** Scouting records include trap captures, degree-day accumulations and biofix date.
	• **Obliquebanded leafroller:** Visual scouting of infested fruit clusters and terminal is documented and identifies blocks which exceed thresholds.
	• **Summer diseases:** Accumulated wetting hours from petal fall are documented.
	• **Apple maggot:** Trap counts are documented and identify blocks exceeding thresholds.
	• **Brown marmorated stink bug:** Visual scouting results for fresh feeding damage are documented.
	• **Weed management:** Weed species and location, e.g., tree row or row middle, are documented.
	• **Redbanded leafroller:** Scouting records include trap counts and sampling data from visual inspection of fruiting clusters and terminals.
	• **Additional pests:** Visual scouting data and/or trap counts are provided for aphids, leafhoppers, scales and additional pests, as per Extension recommendations for monitoring. Consult the Midwest, Michigan, Cornell, New England, Mid-Atlantic or Pennsylvania tree fruit pest management guidelines for additional monitoring guidance.
	Pesticide application records include: ☐ Date of application ☐ Blocks and acreage treated ☐ Trade name and product formulation ☐ EPA registration number (including mating disruption, herbicides and rodenticides. ☐ Target pest ☐ Rate per acre (oz., gal. or lb./ acre) and application method ☐ Time, air temperature, average wind speed and direction during application.
Records available for on-farm audit	
	• Soil and foliar nutrient testing results are available for inspection.
	• Nutrient records from the past 12 months are available for inspection.
	• Procedures, results and adjustments from the most recent calibration are available for inspection.
	• Scouting records for the current and previous season are available for inspection.

PEST AND MATERIALS	RATE PER ACRE
Dormant to Silver Tip	
Fire blight	
Champ Flowable	5.33 - 10.5 pt.
C-O-C-S WDG	8 - 15 lb.
Cuprofix Ultra 40 Disperss	5 - 7.5 lb.
Kocide 2000	6 - 12 lb.
Kocide 3000	3.5 - 7 lb.
Early-season copper applications may reduce apple scab, fire blight and black, white and bitter rot inoculum.	
Apple scab	
Spraying the surface of the leaves with urea will reduce spores by about 66%. Use feed-grade urea (46-0-0) and mix a 5% solution in water. Feed-grade urea dissolves in water much easier than granular (fertilizer-grade) urea. For greatest efficacy make applications in the autumn before leaf drop. If applied after leaf drop, make applications at least two weeks prior to bud break using a boom sprayer or an air-blast sprayer with only the lower nozzle(s) turned on. A 5% urea solution supplies about 20 lb. of actual nitrogen per acre. Nitrogen fertilizer application rates must be adjusted accordingly. NOTE: Do not apply to highly vigorous growing trees or trees with history of fire blight.	
Urea 5% solution (46-0-0)	44 lb. per 100 gal.
NOTE: If 46-0-0 urea is not available, the amount of urea mixed to 100 gallons of water must be adjusted to maintain a 5% solution.	
Green Tip	
Fire blight	
Late dormant or silver-tip application of copper is preferred, if none was made it can be made at this time.	
Apple scab	
Copper offers limited protection against apple scab for five to seven days in orchards with low inoculum, e.g., without significant scab the previous season. **Copper is the first choice for orchards with low inoculum**. See rates for fire blight above.	
In orchards with significant scab the previous season, Syllit (dodine) or Vangard (cyprodinil) plus captan or a mancozeb product is suggested as the **first choice**. Syllit should not be used with copper or where resistance is suspected. Mancozeb plus copper or a low rate of captan may be applied as a **second choice**. Manzate and Penncozeb are trade names for mancozeb and are virtually the same.	
When weather is cool and wet, e.g., ≤ 70°F, Vangard may offer better performance than strobilurin (QoI) or sterol inhibitor (DMI) fungicides.	
Syllit 65 WP	1 lb.
Vangard 75 WG	3 - 5 oz.
NOTE: Tank mix all single-site fungicides with a half rate of captan or an EBDC. If a protectant fungicide is used alone apply within the recommended label rate.	

PEST AND MATERIALS	RATE PER ACRE
Green Tip (continued)	
Captan 4L ..……..	3 - 4 qt.
Captan 50 WP …..……..	8 lb.
Captan 80 WP …….	5 lb.
NOTE: Do not use captan within 10 days of an oil application.	
Penncozeb 75 DF or similar mancozeb product ……..…….	6.4 lb.
Penncozeb 80 WP or similar mancozeb product …….……	6 lb.
NOTE: Mancozeb may be applied on a pre-bloom or extended-spray schedule. During the pre-bloom schedule, full-rate applications may be applied through bloom. The extended-spray schedule allows half-rate applications up to 77 days before harvest. Do not mix the pre-bloom and extended-spray schedule.	
Half-Inch Green	
Apple scab: Same options as Green Tip, except DO NOT USE COPPER.	
Mites and scale insects	
Horticultural oil (listed rate is for products comprised of 98% mineral oil)..	3 - 8 gal.
Scale insects	
All insecticides targeting scale insects need should be applied as a full dilute spray. Apply 100 gal. of water per acre in high-density plantings and 400 gal. of water per acre to standard trees in low-density plantings.	
Centaur WDG …….....	34.5 oz.
Esteem 35 WP …….....	4 - 5 oz.
Sivanto 200 SL …….	10.5 - 14 fl. oz.
NOTE: Combine with a horticultural oil for early season applications targeting San Jose scale.	
Rosy apple aphid (timing is critical for effective control)	
Beleaf 50 SG ...……..……	2 - 2.8 oz
Esteem 35 WP …….....	3 - 5 oz.
Sivanto 200 SL (aphid species, except woolly apple aphid) …..…….	7 - 10.5 fl. oz.
Versys (aphid species, except wooly apple aphid) ……	1.5 fl. oz.
Tight Cluster	
Apple scab All single-site fungicides are at risk for resistance development; all applications must be tank-mixed with a protectant fungicide, e.g., captan or EBDC. EBDCs also control rust diseases where inoculum is low to moderate. Reference product label for restrictions on reapplication intervals and maximum number of applications per season. If weather is persistently cool and wet, e.g., ≤ 70°F from pink to bloom, Inspire Super (difenoconazole + cyprodinil), may be applied. Cyprodinil is an anilinopyrimidine (AP) and may perform better than QoI or DMI fungicides when it is cool and wet.	

PEST AND MATERIALS	RATE PER ACRE
Tight Cluster (continued)	
Aprovia …..…….....	5.5 - 7 fl. oz.
Cevya…….....……	4 - 5 fl. oz.
Excalia…….....……	3 - 4 fl. oz.
Flint Extra ……....	2.5 – 2.9 fl. oz.
Fontelis …….	16 - 20 fl. oz.
Inspire Super …….....	12 fl. oz.
Indar 2F …….....	6 - 8 fl. oz.
Luna Sensation …….....	4 - 5.8 fl. oz.
Merivon …….	4 - 5.5 fl. oz.
Miravis…….....……	3.4 fl. oz.
Rally 40 WSP ……...	5 - 8 oz.
Sercadis …….....	3.5 - 4.5 fl. oz.
Sovran ..……	3.2 - 6.4 oz.
Topguard ..…….....	13 fl. oz.
Vangard 75 WG ..……	3 - 5 oz.
Tank mix all single-site fungicides with a half rate of captan or an EBDC. If a protectant fungicide is used alone apply within the recommended label rate.	
Captan 4L ..……..	3 - 4 qt.
Captan 50 WP ……..	8 lb.
Captan 80 WP …….	5 lb.
NOTE: Do not use captan within 10 days of an oil application.	
Penncozeb 75 DF or similar mancozeb formulated products ……..	6.4 lb.
Penncozeb 80 WP or similar mancozeb formulated products ……	6 lb.
Cedar apple rust EBDCs control rust diseases where inoculum is low to moderate. Additional fungicide treatments targeting rusts before petal fall may not be necessary in dry years or under low/moderate pressure. Pre-bloom treatment of rusts may be advised where there is a history of rust infections or if spring weather consistently cool and wet. Powdery mildew and apple scab are often prioritized over rust at Tight Cluster, and only fungicides that offer strong efficacy on apple scab, powdery mildew and rust are included.	
Ceyva…….....…….	4 - 5 fl. oz.
Fontelis…….	16 - 20 fl. oz.
Miravis…….....……	3.4 fl. oz.
Topguard Specialty…….	13 fl. oz.

PEST AND MATERIALS	RATE PER ACRE
Tight Cluster (continued)	
Powdery mildew Fungicide applications target powdery mildew between tight cluster and petal fall. Severe infections may continue until terminal shoot growth stops. Factors that influence infection risk may include: amount of shoot growth, unprotected tissue and warm temperatures. Powdery mildew thrives during warm-dry weather, i.e., 50° - 70°F. The following products have been identified because of their good ability to manage powdery mildew.	
Cevya…….....……	4 - 5 fl. oz.
Excalia…….....……	3 - 4 fl. oz.
Fontelis ….……	16 - 20 fl. oz.
Inspire Super ……..	12 fl. oz.
Luna Sensation ……	5 - 5.8 fl. oz.
Merivon ……	4 - 5.5 fl. oz.
Miravis…….....……	3.4 fl. oz.
Pristine……	14.5 - 18.5 oz.
Procure 480 SC ……	8 - 16 fl. oz.
Sercadis.....	3.5 - 4.5 fl. oz.
Rally 40 WSP ……	5 - 10 oz.
Topguard Specialty ……..	8 - 13 fl. oz.
Kumulus DF (sulfur) ……	10 - 20 lb.
NOTE: Tank mix all single-site fungicides with a protectant fungicide appropriate for the target disease, e.g., captan or an EBDC for scab; EBDC for rust or sulfur for powdery mildew. Captan and EBDCs do not control powdery mildew. NOTE: Sulfur is a broad-spectrum protectant and may be tank mixed with sterol inhibitors (DMIs) or strobilurins (QoIs) for added protection and resistance management for powdery mildew. Do not apply sulfur within 14 days of an oil application. Do not use captan in combination with or closely following or in alternation with sulfur products. Use product label to verify use restrictions.	
Mites or San Jose scale	
Horticultural oil (listed rate is for products comprised of 98% mineral oil)..	3 - 8 gal.
Mites: Only if oil is not used.	
Zeal ……..…..……	4 - 6 fl. oz.
Scale insects: Only if oil is not used.	
Centaur WDG ..…….....	34.5 oz.
Esteem 35 WP ..…….……	4 - 5 fl. oz.
Sivanto 200 SL ..…….	10.5 - 14 fl. oz.
NOTE: Combine with a horticultural oil for early-season applications targeting San Jose scale.	

PEST AND MATERIALS	RATE PER ACRE
Tight Cluster (continued)	
Tarnished plant bug: If over threshold on white rectangle traps.	
Avaunt …….....……..……	5 - 6 oz.
Beleaf 50 SG .....……..……	2 - 2.8 oz.
Rosy apple aphid	
Esteem 35 WP …….....	3 - 5 oz.
Beleaf 50 SG .....……..……	2 - 2.8 oz.
Sivanto 200 SL (aphid species, except woolly apple aphid) ..……..	7 - 10.5 fl. oz.
Versys (aphid species, except wooly apple aphid) ….....	1.5 fl. oz.
Pink	
Apple scab: Same as Tight Cluster.	
Powdery mildew: Same options as Tight Cluster.	
Cedar apple rust: Same options as Tight Cluster.	
Mites: If needed, same as Tight Cluster (excluding oil, which can damage flower buds).	
Tarnished plant bug: If over threshold on white rectangle traps, same as Tight Cluster.	
Bloom	
Apple scab: Same as Tight Cluster.	
Powdery mildew: Same as Tight Cluster.	
Cedar apple rust: Same options as Tight Cluster.	
Fire blight NOTE: Streptomycin or oxytetracycline must be applied for fire blight only according to a weather-based forecasting program such as Maryblyt or CougarBlight. Kasumin 2L may be used where resistance is suspected. After bloom, streptomycin may only be applied if hail or high wind damage occurs in orchards with existing infections.	
Blossom blight	
Agri-Mycin 17 WP ……..……	24 - 48 oz.
OR A COMBINATION OF	
Regulaid (nonionic surfactant) ……..……	1 - 2 pt. per 100 gal. (do not concentrate)
If in 2 - 4 days a second application is needed	
Serenade Opti ..……	14 - 20 oz.
If in 2 - 4 days a third application is needed, repeat streptomycin. See rates above.	

PEST AND MATERIALS	RATE PER ACRE
Bloom (continued)	
Shoot blight (late bloom or early petal fall)	
Trees > 5 years old	
Apogee 27.5 DF ..……	18 - 36 oz.
Trees < 5 years old	
Apogee 27.5 DF ..……	9 - 18 oz.
NOTE: Applying Apogee will help suppress shoot blight and reduce vegetative growth. Begin applications when shoot growth is less than three inches in length; approximately a seven to ten-day window beginning at the king bloom petal fall stage. Most years, all varieties can be treated at this time. Apply a second application two weeks later and a third application two weeks after the second. A fourth application is optional and need should be determined by assessing crop load and tree vigor. Rates used to control shoot growth are dependent on tree vigor and vary from 9 - 36 oz. per acre.	
Cueva…….....……	0.5-2 gal.
NOTE: Cueva should only be used for shoot blight post bloom.	
Codling moth: Pheromones for mating disruption.	
Isomate CTT ..……..	100 - 200 dispensers
Checkmate CM-F	2.4 - 4.8 fl. oz.
Cidetrak CMDA Combo Meso-A ……..	18 – 36 dispensers
Cidetrak CMDA + OFM Meso ……	30 – 38 dispensers
NOTE: Apply pheromone mating disruption before initiation of moth flight (e.g., bloom for first generation, by late June for second generation); supplemental insecticide sprays timed to coincide with egg hatch may be needed and could include border sprays in blocks adjacent to sources of adult immigration or other high-pressure situations.	
Obliquebanded leafroller: If needed, based on ≥ 3% infested blossom clusters.	
Agree WG ..…….....	1 - 2 lb.
DiPel DF ..…....	0.5 - 2 lb.
Spear LEP….....	1-2 pt.
NOTE: Recommended as a tank mix with Bt products. Spear LEP in combination with Bt is only effective on the larval stages of listed lepidopteran pests. Repeat applications at three to ten day intervals (or at intervals necessary to maintain control) depending upon plant growth rate, pest activity and other factors.	
Intrepid 2F ….....	8 – 16 fl. Oz.

PESTS AND MATERIALS	RATE PER ACRE
Petal Fall	
Apple scab: Same as Tight Cluster. NOTE: Not recommended to use EBDCs after bloom if you use miticides other than oil. Avoiding EBDCs after bloom will preserve predators. Do not apply EBDCs within 77 days of harvest. If the earliest harvest date is August 15th no mancozeb or metiram can be applied after May 30th to comply with the pre-harvest interval. NOTE: DO NOT apply Excalia at petal fall.	
Powdery mildew and rust diseases Petal fall is when the crop is at the greatest risk for infections from powdery mildew and rust diseases. Efficacy of DMI and strobilurin fungicides can vary between apple scab, powdery mildew and rust. Control of apple scab through primary infection period is of utmost importance. If powdery mildew or rust diseases have been seen in a block in the previous year or present season, include a fungicide that is effective against powdery mildew and rust at least twice during the pink-petal fall period. **The following products have been identified because of their good ability to manage powdery mildew and scab.**	
Cevya…….....……	4 - 5 fl. oz.
Flint Extra ……..	2.5 – 2.9 fl. oz.
Sovran ……..……..	3.2 – 6.4 oz.
Luna Sensation ……	5 – 5.8 fl. Oz.
Merivon ……...……	4 – 5.5 fl. Oz.
Miravis…….....……	3.4 fl. oz.
PLUS Tank mix all single-site fungicides with sulfur or a half rate of an EBDC. If a protectant fungicide is used alone apply within the recommended label rate. NOTE: EBDCs and captan do not control powdery mildew.	
Kumulus DF (sulfur) ……..……	10 – 20 lb.
NOTE: Sulfur is a broad-spectrum protectant and may be tank mixed with DMI and Strobilurins for added protection and resistance management. Do not apply sulfur within 14 days of an oil application. Do not use captan in combination with or closely following or in alternation with sulfur products. Use product label to verify use restrictions. Fruit russeting and yield reduction can occur if sulfur is applied during hot temperatures (>80°F), especially following bloom.	
See 'Tight Cluster' for fungicides with strong efficacy on rust diseases.	
PLUS Tank mix all single-site fungicides with a half rate of an EBDC. If an EBDC fungicide is used alone apply within the recommended label rate. NOTE: Captan does not control rusts.	
Penncozeb 75 DF or similar mancozeb formulated products …….	3.2 lb.
Penncozeb 80 WP or similar mancozeb formulated products ……	3 lb.
NOTE: EBDCs control rust diseases where inoculum is low to moderate and have no activity on powdery mildew.	

PEST AND MATERIALS	RATE PER ACRE
Petal Fall (continued)	
Mites: Make no more than two post-bloom miticide applications per season (except for oil).	
Horticultural Oil (listed rate is for products comprised of 98% mineral oil)..	1.5 gal
Envidor 2 SC ……	16 – 18 oz.
Portal ……..	2 pt.
Nealta ……	13.7 fl. Oz.
Zeal SC ..……..	4 – 6 fl. Oz.
Acramite 50 WS ..…….	0.75 – 1 lb.
Kanemite 15 SC ..…….	21 – 31 fl. Oz.
(Acramite and Kanemite are effective adulticides and thus may be best reserved for later in the season)	
Plum curculio or European apple sawfly: Application based on scouting, block or region history.	
Actara ……..……..	4.5 – 5.5 oz.
Assail 30 SG (European apple sawfly) ……	5 – 8 oz
Assail 30 SG (plum curculio) ……..…….....	8 oz
Avaunt ……	5 – 6 oz.
Exirel (European apple sawfly) …….	8.5 – 17 fl. Oz.
Exirel (plum curculio) ……..…….....	13.5 – 20.5 fl. Oz.
Verdepryn 100SL (plum curculio, European apple sawfly)	5.5 - 11 fl. oz.
NOTE: Carbaryl applied as a thinner may also suppress plum curculio or European apple sawfly, but may only be applied for thinning purposes.	
Obliquebanded leafroller and red banded leafroller: If needed based on ≥ 3% infested blossom clusters (only if not treated at bloom).	
Altacor * …… ……	2.5 – 4.5 oz.
Delegate WG * ……..……..	4.5 – 7 oz.
Exirel * ……..	8.5 – 17 fl. Oz.
NOTE: * Do not expose more than one generation of the target pest to this mode of action alone.	
Agree WG …….....	1 – 2 lb.
DiPel DF …….....	0.5 – 2 lb.
Spear LEP	1 - 2 pt.
NOTE: Recommended as a tank mix with Bt products (Agree, Dipel DF). Spear LEP in combination with Bt is only effective on the larval stages of listed lepidopteran pests. Repeat applications at three to ten day intervals (or at intervals necessary to maintain control) depending upon plant growth rate, pest activity and other factors.	
Intrepid 2F	8 - 16 fl. oz.
Verdepyryn 100SL (Obliquebanded leafroller, redbanded leafroller)	5.5 - 11 fl. oz.

PEST AND MATERIALS	RATE PER ACRE
Petal Fall (continued)	
Rosy apple aphid	
Alias 4F, Montana 4F and Wrangler (imidacloprid)……..	1.6 – 2.8 fl. oz.
Assail 30 SG ……..	2.5 - 4 oz.
Beleaf 50 SG ....…….……	2 - 2.8 oz.
Sivanto 200 SL ……..	7 - 10.5 fl. oz.
Versys (aphid species, except wooly apple aphid)	1.5 fl. oz.
Woolly apple aphid: If needed based on block history.	
Beleaf 50 SG	2 - 2.8 oz.
Movento	6 - 9 fl. oz.
Dogwood borer: If needed based on block history.	
Isomate DWB …….....	100 - 200 dispensers
First Cover	
Apple scab: Same as Petal Fall. NOTE: If visible scab lesions are found during scouting a protectant-only program is recommended. To delay resistance avoid applications of SDHI, DMI and strobilurin fungicides which have strong activity on apple scab.	
Powdery mildew and rust diseases: Same as Petal Fall NOTE: For powdery mildew control after Second Cover, make applications based on previous history and scouting.	
Cedar Apple Rust: Same options as Tight Cluster.	
Brown marmorated stink bug (BMSB) See management guidelines on page 12.	
Plum curculio Same as Petal Fall, except after the 1st application for plum curculio, base any additional treatment decisions on scouting for fresh injury and/ or a degree-day based oviposition model. After the first application for plum curculio, use perimeter row sprays rather than whole-block treatments. NOTE: For trees less than seven feet in height, or where scouting indicates fresh injury in the interior of a block, full-block applications may be made.	
San Jose scale: If needed based on block history. Make first application at 500 DD, base 50°F, from March 1st and a second 14 days later. If pressure is severe as indicated by pheromone traps or fruit damage, an additional treatment against second-generation crawlers at 1450 DD from March 1st (in late July to August) with a second application 14 days later.	
Centaur WDG ……....	34.5 oz.
Esteem 35 WP …….	4 - 5 oz.
Grandevo	2 - 3 lb.
Movento ……..……..	6 - 9 fl. oz.
Sivanto 200 SL …….	10.5 - 14 fl. oz.
Venerate	2 - 4 qt.

PEST AND MATERIALS	RATE PER ACRE
First Cover (Continued)	
Codling moth: If needed based on block or region history.	
Altacor …….……	2.5 - 4.5 oz.
Delegate WG …..……....	4.5 - 7 oz.
Exirel ……...	8.5 - 17 fl. oz.
Assail 30 SG …….	4 - 8 oz.
Verdepryn 100SL……..	5.5 - 11 fl. oz.
NOTE: Apply first treatment no earlier than 250-degree days (DD), base 50°F, have accumulated after the first sustained pheromone trap catch (biofix) followed by a second at 10 to 14-day interval. Ovicides may be applied no earlier than 50 to 100 DD from codling moth biofix. If pressure is severe as indicated by pheromone traps or fruit damage, an additional application may be made 10 to 14 days later. Do not expose more than one generation of the target pest to this mode of action alone, e.g., use an alternative material for the other codling moth generation.	
Carpovirusine (codling moth only) *…….....	6.8 - 13.5 fl. oz.
CYD-X (codling moth only) *…….....	1 - 6 fl. oz.
Madex HP (codling moth and oriental fruit moth only) ……..	0.5 - 3 fl. oz.
NOTE: *Active ingredient contains granulosis virus which only attacks codling moth larvae and work well in combination with mating disruption. These pesticides must be applied starting at first egg hatch and every 7 - 8 days during the moth flight, or about four applications per generation. Multiple applications at low rates are preferred.	
Second Cover	
Apple scab	
Captan 4L ……	2 - 4 lb.
Captan 50 WP ……..	4 - 8 lb.
Captan 80 WP ……..	2.5 - 5 lb.
Powdery mildew: Same as Petal Fall, use previous history and scouting to determine need for applications after Second Cover.	
Plum curculio: See First Cover.	
Japanese beetle	
Actara …….	5.5 oz
Assail 30 SG	5 - 8 oz.
Multiple applications may be needed. Spot treatments should be considered where activity is limited within the orchard. Applications limited to the top of the canopy where feeding is occurring may be effective. Sample to determine if broad spectrum insecticides applied for other pests reduce or eliminate the need to apply an insecticide for Japanese beetle.	
San Jose scale: See First Cover.	
Woolly apple aphid: Same as Petal Fall and only if needed based on block history.	
BMSB: See management guidelines on page 12.	

PEST AND MATERIALS	RATE PER ACRE
Second Cover (continued)	
Codling moth and oriental fruit moth: See First Cover for insecticide options.	
Pheromone disruption: For best results, make applications before the start of summer generation moth flights.	
Isomate OFM TT (oriental fruit moth)	100 dispensers
Isomate C TT (codling moth)	100 - 200 dispensers
Isomate CM/ OFM TT (both species)	200 dispensers
Isomate CM/ OFM Mist (both species)	1 - 2 units
Checkmate OFM-F (oriental fruit moth)	1.32 - 2.93 fl. oz.
Checkmate CM-F (codling moth)	2.4 - 4.8 fl. oz.
Verdepryn ……..	5.5 - 11 fl. oz.
Third Cover	
Sooty blotch and flyspeck (SBFS) and select fruit rots	
Do not treat for SBFS and/or fruit rots unless need is indicated by previous history and/or weather monitoring for wetting hours. Fungicides for SBFS may be applied after 185 wetting hours have accumulated from McIntosh petal fall. Track wetting hours from petal fall using a weather station. If wetting data are not available, early July may be used as an estimated date to begin applications.	
Indar 2F …….	6 - 8 fl. oz.
Inspire Super …….	12 fl. oz.
ProPhyt …..…….	4 - 6 pt.
Flint Extra ……..	2.5 – 2.9 fl. oz.
Pristine ..…….	14.5 - 18.5 oz.
Sovran ……..…….	3.2 - 6.4 oz.
Topsin M WSB ..……	0.75 - 1 lb.
Captan 4L ……..	2 - 4 lb.
Captan 50 WP ……..	4 - 8 lb.
Captan 80 WP ……..	2.5 - 5 lb.

ADDITIONAL NOTES:

1. Fungicide wash-off and reapplication intervals for SBFS control:

Fungicide	Rate per acre	Minimum interval (days)	Maximum rainfall (in.) during interval
Captan 80	2.5 lb.	21	2.0
plus Topsin M	9 oz.		
or ProPhyte 4.2 L	48 fl. oz.		
or Sovran	6.4 oz.		
or Flint Extra	2.5 oz.		
Captan 80	3 lb.	14	1.5
Pristine	14.5 oz.	21	2.5

2. Flint Extra, Pristine, Sovran and Topsin manage select fruit rots. See label.
3. Use Topsin M only where summer disease pressure is heavy indicated by block history. Use no more than 4 lb. per acre per year.
4. When tank mixing captan with single-site fungicide, apply a half rate of captan. If captan is used alone apply within the recommended label rate.

PEST AND MATERIALS	RATE PER ACRE
Third Cover (continued)	
Bitter rot If needed based on block or region history. Apply one of the following PLUS captan before a predicted heatwave (≥ 90°F). Applying the fungicide cover after the heat wave before any precipitation may also work.	
Flint Extra ……	3 oz.
Merivon ……	4 - 5.5 fl. oz.
Pristine ……	14.5 - 18.5 oz.
PLUS Tank mix all single-site fungicides with captan.	
Captan 80 WDG……..	4 - 5 lb.
Apply Captan 80 WDG (4 – 5 lb./A) on a 14-day interval when bitter pit inoculum is present and weather is favorable for infection.	
NOTE: Activating trickle irrigation three to five days before the heat arrives (≥ 90°F) will help ensure that soil moisture is near saturation levels and trees are not water stressed when the heat arrives. Heat injury may be a predisposing factor to infection.	
Obliquebanded leafroller: Base application timing on trap catches and degree-day model (360 DD, base 43°F, after first adult catch).	
Altacor * ……..	2.5 - 4.5 oz.
Delegate WG * ……..	4.5 - 7 oz.
Exirel * ……..	8.5 - 17 fl. oz.
NOTE: *Do not expose more than one generation of the target pest to this mode of action alone.	
Agree WG …….	1 - 2 lb.
DiPel DF …….	0.5 - 2 lb.
Entrust SC	6 - 10 fl. oz.
Additional sprays may be required after 10 - 14 days, to treat all first-generation larva.	
Fruit sunburn: If needed based on cultivar, block or region history.	
Purshade ……	2 - 3 gal.
Grower comments: growers do not usually apply Purshade after end of July because it is difficult to wash off harvested fruit.	
Raynox Apple Sunburn Protectant……	2.5 gal.
Grower comments: Raynox is difficult to mix in the spray tank and there can be issues with the materials clogging nozzles.	
Surround WP ……	25 - 50 lb.
NOTE: The impacts of sunburn can be mitigated by scheduling frequent irrigation to avoid tree-water stress; avoiding excessive summer pruning, especially before or during hot weather; protecting picked fruit in bins from direct sunlight and improving air flow in the orchard to keep fruit cool.	

PEST AND MATERIALS	RATE PER ACRE
After Third Cover	
Apple scab, sooty blotch and fly speck, fruit rots: Same as Third Cover NOTE: Single-site fungicides 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.	
Apple maggot: Base applications on monitoring traps (threshold of ≥1 for unbaited spheres or ≥5 for baited spheres) or use trap-out spheres. Alias 4F, Montana 4F and Wrangler (imidacloprid)…….. Assail 30 SG ..... Belay ……..... Exirel …….. Venerate ……..……. Surround WP [Frequent applications (7 - 10 day intervals) and maximal coverage (minimum of 100 gal./ acre are advised while there is active foliar growth)]	 2.8 fl. oz. 8 oz. 6 fl. oz. 13.5 - 20.5 fl. oz. 4 - 8 qt. 25 - 50 lb.
BMSB: See management guidelines on page 15.	
Codling moth and oriental fruit moth Base applications on trap catch (1st adult flight biofix) and degree-day models (CM: 250 DD, base 50°F, from biofix; OFM: 170 DD, base 45°F, from biofix), plus follow-up application 10 -14 days later for each brood. If lesser appleworm is a problem indicated by block history or monitoring, Delegate or Altacor may be applied just prior to egg hatch followed by a second application 10 - 14 days later. Any codling moth applications are also likely to control lesser appleworm, thus in orchards treating for codling moth, applications specifically for lesser appleworm are not likely to be needed. Altacor * …… Delegate WG * ….…….. Exirel * …….. Assail 30 SG * …… NOTE: * Do not expose more than one generation of the target pest to this mode of action alone. Avaunt …….. Intrepid 2F …… Suppression only for codling moth, use maximum label rate. Carpovirusine (codling moth only) ……..... CYD-X (codling moth only) ……..... Madex HP (codling moth and oriental fruit moth only) ……..... **Mites:** Make no more than two post-bloom miticide applications per season. Acramite 50 WS …..…… Envidor 2 SC …….. Portal ……..... Kanemite 15 SC ……..…… Nealta …… Zeal SC ……..……..	 2.5 - 4.5 oz. 4.5 - 7 oz. 8.5 - 17 fl. oz. 5 - 8 oz. 5 - 6 oz. 12 - 16 fl. oz. 6.8 - 13.5 fl. oz. 1 - 6 fl. oz. 0.5 - 3 fl. oz. 0.75 - 1 lb. 16 - 18 oz. 2 pt. 21 - 31 fl. oz. 13.7 fl. oz. 4 - 6 fl. oz.

Management Guidelines for Brown Marmorated Stink Bug (BMSB)	
BMSB High-Risk Blocks	**RATE PER ACRE**
Has a history of confirmed BMSB damage to fruit, or after third cover, BMSB nymphs or adults found during scouting or in traps, or feeding injury to fruit. NOTE: Injury caused by over wintering adults in June and early July is not likely to result in economic losses.	
Actara * + Surround WP	
Actara * …….…….	5.5 oz.
Surround WP …….…….....	25 to 50 lb.
NOTE: Tank mixing Surround with Actara is recommended to increase efficacy.	
Actara * without Surround …….	5.5 oz.
Assail ……..……..	8 oz.
Belay ** ..……..…….	6 fl. oz.
Baythroid XL …….	2.4 fl. oz.
Danitol 2.4 EC * ……...	21 1/3 fl. oz.
Brigade WSB ***	12.8 - 32 oz.
Bifenture 10DF ***	12.8 - 32 oz.
Bifenture EC ***	5.2 - 12.8 fl. oz.
Scorpion ** …..…….…….	8 - 12 fl. oz.
Venerate ….……..…….	4 - 8 qt.
Venom ** ……..…….....	4 - 6.75 oz.
Warrior II …….....	2.56 fl. oz.

NOTES:

- Processors may have special restrictions on fruit treated with Surround.
- Scorpion and Venom (dinotefuran) may not be used for BMSB until after petal fall according to the manufacture label restrictions.
- Use of pyrethroids (Danitol, Baythroid, Warrior II) or Lannate is likely to eliminate or greatly reduce effectiveness of bio-control for mites and other pests.
- * Additional use restrictions for New York producers, see product label.
- ** Not registered for use in New York.
- *** Pending Section 18 approval.

Weed Management

Always begin your weed management program by identifying target weeds from scouting reports and weed maps from the previous season.

NOTES:

- Rotate herbicide mode of action between applications (during and between seasons). Weed Science Society of America (WSSA) herbicide-herbicide group codes help identify product rotations. Each application must rotate to an herbicide with a different WSSA grouping number unless the product is tank mixed with an herbicide with an alternative WSSA grouping number.
- Weed species that have developed resistance to glyphosate include rigid ryegrass, horseweed (marestail), Italian ryegrass, common ragweed, palmer amaranth, waterhemp.
- Pre-emergent herbicides may be applied in spring or fall
- Where herbicide labels allow tank mixes, special application rates may apply. Growers may also be required to have supplemental labels on hand for tank-mix applications.
- * Rely 280 (glufosinate-ammonium): To avoid serious damage avoid contact of spray, drift or mist with green bark, stems or foliage. See product label for advisory statement.
- ** Chateau: Do not apply after green tip (label changed in 2022).

STAGE	WSSA Group	PEST AND MATERIALS	RATE PER ACRE
Dormant to terminal-bud set		**Pre and/or post-emergence weed suppression**	
	5	Princep 4L ……..	2 - 4 qt.
	5	Sinbar WDG ……	2 - 4 lb.
	14	**Chateau ……..	6 - 12 oz.
	2	Matrix ……..	4 oz.
	29	Alion …….	5 - 6.5 fl. oz.
		If actively growing weeds are present include one of the following:	
	9	Glyphosate-based herbicides (product and rate may vary)	
	10	Rely 280 * …….....	48 - 82 fl. oz.
	14	Aim EC ……..…..	1 - 2 fl. oz.
Early summer (after terminal-bud set)		**Burn-down weed suppression**	
	9	Glyphosate-based herbicides (product and rate may vary)	
	10	Rely 280 * ……..…	48 - 82 fl. oz.
	14	Aim EC ……	1 - 2 fl. oz.
	22	Gramoxone SL	2.5 - 4 pts.
		Post-emergent grass suppression	
	1	Poast Herbicide ……..	2 - 4 pt.
	1	Select Plus (CAUTION label, non-bearing trees only).	
Fall		See dormant to terminal-bud set.	
Spot treatment of post-emergent weeds	9	Glyphosate-based herbicides (product and rate may vary)	
	10	Rely 280 * ……	48 - 82 fl. oz.
	14	Aim EC ……	1 - 2 fl. oz.
	4	Stinger ……	1/3 - 2/3 pt.
		Burn down of root suckers	
	14	Aim EC ……	2 fl. oz.
		NOTE: Apply when tissue is young and not hardened off.	
	22	Gramoxone SL	2.5 - 4 pts.

Neonicotinoids and Alternatives for Management of Selected Pests									
Trade Name	**Active Ingredient**	**AM**	**INT**	**PLH**	**PC**	**RAA**	**SJS**	**TPB**	**WAA**
Neonicotinoids									
*Actara	thiamethoxam	**1**	**1**	**3**	**3**	**3**	**0**	**2**	
*Alias/Wrangler	imidacloprid	**X**		**3**		**3**	**2**		
*Assail	acetamiprid	**3**	**3**	**3**	**2**	**3**	**2**	**2**	**2**
*Belay	clothianidin	**X**	**2**	**3**	**X**	**3**	**X**		
Neonicotinoid alternatives									
*Altacor	chlorantraniliprole	**2**	**3**	**S**	**S**				
Avaunt	indoxacarb	**2**	**2**	**3**	**3**			**2**	
Neemix	azadirachtin		**2**	**2**		**2**			
Dipel	*Bacillus thuringiensis*		**2**						
*Delegate	spinetoram	**S**	**3**		**S**				
Esteem	pyriproxyfen		**2**			**3**	**3**		
Intrepid	methoxyfenozide		**2**			**X**			
Movento	spirotetramat						**3**		**3**
*Exirel	cyantraniliprole	**S**	**3**		**3**	**X**			
Centaur	buprofezin			**2**			**3**		

Key to control ratings

Cornell rating: 3 - Good, **2** - Fair, **1** - Poor, **X** - Pest on product label, **S** - Product labeled suppression only

Apple maggot - **AM**, Internal feeding lepidoptera (codling moth, lesser appleworm or oriental fruit moth) - **INT**, Potato leaf hopper - **PLH**, Plum curculio - **PC**, Rosy apple aphid - **RAA**, San Jose scale - **SJS**, Tarnished plant bug - **TPB,** Woolly apple aphid - **WAA**

Adapted from the *Cornell Crop and Pest Management Guidelines,* Table 7.1.1 Activity of spectrum of pome fruit insecticides and acaricides, https://cropandpestguides.cce.cornell.edu/Preview/2019/Tree_Fruit_Promo_19.pdf

Clothianidin (Belay) rating was adapted from the *Penn State Tree Fruit Production Guide*, extension.psu.edu/plants/tree-fruit/tfpg

NOTE: *'USE WITH RESTRICTIONS (MODERATE to HIGH-RISK PESTICIDES), RESTRICTIONS WHICH EXCEED THE PRODUCT LABEL' classification.

Insect Trap Counts

Date	Station ID	Station ID	Station ID	Station ID	Station ID	Station ID	Station ID	Station ID

IPM Institute of North America Inc. – Scouting Report

Contact: _____ **Communicated with contact:**

Farm: _____ **Circle:** In Person Email Phone

Date: _____

Monitoring Supplies			Diseases		Insects	
Product	**Amount Used**	**Pest(s)**	AS	Apple scab	PC	Plum curculio
Trap liner			PM	Powdery mildew	CM	Codling moth
			FB	Fire blight	AM	Apple maggot
			SBFS	Sooty blotch and flyspeck	Leps	Obliquebanded/ redbanded leafroller, and green fruitworm
Pheromone			CAR	Cedar apple rust	ME	European red mite eggs
			BR	Bitter rot	ERM	European red mite
			BP	Bitter pit	TPB	Tarnished plant bug
Delta trap			SL	Silver leaf	LAW	Lesser appleworm
			Beneficial Insects		DWB	Dogwood borer
			LW	Lacewings	JPB	Japanese beetle
Other			SFM	Syrphid fly maggot	LH	Leaf hoppers
			P-mite	Predatory mites	Thrips	Western flower thrips
			BHT	Blackhunter thrips	SJS	San Jose scale
			MPB	Minute pirate bug	BMSB	Brown marmorated stink bug

Site(s)	Observation	Comments

IPM Institute of North America Inc. - Scouting Report

Farm: _____ **Date:** _____

Additional Observations:

Pest observed: _____ **Location** _____

Damage is on: Fruit Foliage Bark/trunk Other

Describe Damage/Symptoms:

Pest observed: _____ **Location** _____

Damage is on: Fruit Foliage Bark/trunk Other

Describe Damage/Symptoms:

Recommendations: