

## Part 2: Pesticide Management for Fruit Trees

	<b>LOW RISK (3)</b>	<b>MODERATE RISK (2)</b>	<b>HIGH RISK (1)</b>	<b>YOUR RANK</b>
<b>1. APPLICATION</b> - <i>Even if you employ a custom applicator, most questions should still be answered.</i>				
<b>IPM decision makers</b>	IPM decision makers are trained and RUP certified, and they keep current on pest problems and control strategies by attending classes and receiving newsletters or alerts several times per year.	IPM decision makers are trained and RUP certified but do not keep current on pest problems and control strategies by regularly attending classes and receiving newsletters or alerts.	IPM decision makers <b>*are not certified RUP applicators</b> and do not keep current on pest problems and control strategies. (Growers only have to be certified if applying RUPs.)	____ ____ ____
<b>Label directions</b>	Grower reads pesticide label before purchase, before use, before storage and before disposal of waste. All label directions are followed.	Grower reads and follows pesticide label directions before use to match the rate with the specific pest.	Pesticide label is not checked for safety precautions or directions for use.	____ ____ ____
<b>Pesticide handler/ applicator safety</b>	Legally required safety standards are met for pesticide handler/ applicator protection, including notification, pesticide storage, signage, reentry times, emergency equipment, protective clothing, and supplies for cleanup of spills and treatment of injuries. Additional safety measures are employed such as daily washing and cleaning of protective clothing and daily changes of respirator pads and filters.	All legal requirements are met.	<b>*Unsure if all legal requirements are met.</b>	____ ____ ____
<b>Pesticide selection</b>	Pesticide selection is based on price, effectiveness, minimizing human health concerns and reducing environmental impacts (e.g., low toxicity, narrow spectrum, no effects on predators, low leaching and runoff potential, low volatility and persistence).	Pesticide selection is based on price and effectiveness against known pests. Health and environment are not significant factors in selection.	Pesticide selection is based on price and effectiveness without consideration of health and environmental impacts.	____ ____ ____

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<b>Sprayer calibration and maintenance</b>	All spray and granular application equipment is serviced and calibrated before each season.  Sprayers are thoroughly rinsed and recalibrated between applications of different types of pesticides.  Calibration is repeated at least once during the growing season.	All spray and granular application equipment is serviced and calibrated before each season.  Sprayers are thoroughly rinsed between applications of different types of pesticides but not recalibrated.	A thorough calibration is performed infrequently <b>* or not at all;</b>  OR, equipment is serviced only after it breaks.	___ ___ ___
<b>Pest monitoring (including weeds, insects, diseases, vertebrates and nematodes)</b>	Orchards are inspected for pests weekly.	Orchards are inspected for pests at critical periods, but not weekly.	Orchards are not inspected for pests.	___ ___ ___
<b>Threshold for application</b>	Pesticides are used only when pest levels are high enough to be at economic threshold.	Some pesticides are used at selected stages of pest development while others are applied at regular intervals.	Pesticides are applied at fixed times.	___ ___ ___
<b>Rates of application</b>	Pesticides are applied at reduced rates or targeted where possible (e.g., band vs. broadcast spray or tree-row volume spraying) and are combined with non-chemical approaches.	Pesticides sometimes are applied at reduced rates or targeted.	Pesticides are used without reducing rates or targeting applications.	___ ___ ___
<b>Resistance management</b>	Insecticides, miticides, fungicides and herbicides with different modes of action are rotated within a season or from one season to the next or used in tank mixes where permitted by label and manufacturer advice. Pesticides at highest risk of resistance are not used when alternatives are available.	Some but not all pesticide modes of action are rotated or tank mixed. Pesticides at highest risk of resistance are used sparingly.	Pesticide modes of action are not rotated or tank mixed. Pesticides are selected without regard to resistance risk.	___ ___ ___

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<b>Record keeping</b>	Records meet all legal requirements (including date, chemical applied, application rate, targeted pest, site of application, weather conditions, EPA registration number, applicator's name and certification number) and document pest management activities (e.g., pest sampling routines, trap counts). Records are retained and used to guide management decisions.	Records meet some of the legal requirements but are incomplete. Records are retained and used to guide management decisions.	<b>*Records of pesticide applications are not kept, are incomplete or not consulted in management decisions.</b>	---	---	---
<b>2. DRIFT MANAGEMENT</b>						
<b>Application equipment</b>	Equipment is used that minimizes the off-target impact of pesticide application (e.g., tower orchard sprayer, electrostatic sprayer, shielded nozzle sprayer, "smart sprayer").	Normal sprayer is used with items such as low-drift nozzles and anti-drift agents.	Standard equipment without special modifications is used for all applications.	---	---	---
<b>Weather conditions during applications</b>	Wind speed and direction and potential temperature inversions are checked before and during spray applications, and spraying is stopped when conditions favoring excessive drift occur. Spraying during the evening, morning and nighttime hours is common.	Wind speed and direction are checked before and during spray applications and spraying is stopped when conditions do not meet legal requirements. Some evening and nighttime spraying is done.	<b>* Weather conditions are not monitored during spray applications.</b> Spraying is always done during standard working hours (e.g., 8 a.m. to 5 p.m.).	---	---	---
<b>Drift management plan</b>	A written plan has been developed that describes the measures used to manage drift and how those measures will reduce the impact of off-target drift. The plan is reviewed annually.	A written plan has been developed that describes the measures used to manage drift and how those measures will reduce the impact of off-target drift. (See <i>GAAMP's for Pesticide Utilization and Pest Control</i> for pesticide drift control measures.)	<b>* No written plan is available.</b>	---	---	---

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<b>3. RUNOFF AND INFILTRATION</b>				
<b>Cover crop</b>	<p>Grass or other cover crop (a natural filter strip) is maintained to minimize the chance of leaching and runoff of pesticides.</p> <p>Cover crops are used during preplant and orchard establishment.</p>	<p>Cover crops are maintained only part of the year or only in some areas of the orchard.</p> <p>Cover crops are not used preplant, and little, if at all during orchard establishment.</p>	<p>Cover crops are not maintained;</p> <p>OR, cultivation is used during orchard establishment on slopes &gt; 2%.</p>	
<b>Leaching potential</b>	<p>Water table is more than 30 feet below the surface for fine-textured soils (silty clay, clay, sandy clay, very fine sandy loam and sandy clay loam) and medium-textured soils (loam, silt loam, silty clay loam and clay loam).</p>	<p>Water table is 10 to 30 feet below the surface for fine- and medium-textured soils;</p> <p>OR, water table is more than 30 feet below the surface for coarse-textured soils (all sands, loamy sands and sandy loam).</p>	<p>Water table is less than 10 feet below the surface for coarse textured soils;</p> <p>OR, water is less than 6 feet below the surface for all other soils.</p>	
<b>Soil conditions (texture, pH, OM, soil moisture, etc.)</b>	<p>Soil characteristics and field conditions are assessed when deciding pesticide application practices, and site-specific or variable rate technology is used.</p>	<p>Field soil conditions are considered when deciding pesticide application rates.</p>	<p>Pesticides are applied at full labeled rates regardless of soil characteristics or field conditions.</p>	
<b>Separation distance of pesticide application from water sources</b>	<p>Pesticide is applied more than 30 feet from an open water source or tile drain inlet and more than 200 feet from a well.</p>	<p>Pesticide is applied less than 30 feet from an open water source or tile drain inlet;</p> <p>OR, less than 150 feet from a well.</p>	<p>Pesticide is applied adjacent to or over the top of a water source, tile drain inlet or well.</p>	

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<b>Irrigation frequency</b>	Irrigation is scheduled according to soil moisture monitoring and adjusted for expected rainfall amounts.	Irrigation is sometimes scheduled according to soil moisture and/or expected rainfall amounts.	Irrigation is scheduled without regard to soil moisture levels.	____ ____ ____
<b>Irrigation efficiency</b>	Irrigation systems deliver water, nutrients and/or pesticides directly to the tree root zone with no runoff and little evaporation (e.g., surface or subsurface drip).	Improvements are made to increase efficiency and decrease soil crusting.	Irrigation systems allow water, nutrients, pesticides and soil particles to leave the system (e.g., overhead sprinkler systems).	____ ____ ____

In addition to this part, you may wish to complete Farm\*A\*Syst worksheets on pesticide storage, mixing and loading, container disposal and emergency planning for the farm.  
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This bulletin was co-authored by the National Farm\*A\*Syst office, Madison, Wisconsin, and adapted for Michigan by Dr. Charles Edson, Dr. Allen Krizek, Dr. Roberta Dow, David Epstein, Dr. Larry Gut, Amy Irish-Brown, Gary Thornton and Don Lehman, Michigan State University. Also contributing were private crop consultants Doug Murray and John Bakker.

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