



# *AEM Tier II Worksheets*

## **Tree Fruit**

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### **Glossary**

**Groundcover management:** systems used to manage weed competition for nutrients and water.

**Integrated Pest Management:** An ecologically-based pest control strategy designed to keep pest populations below economically injurious levels using a variety of control tactics.

**Scouting:** Detecting, identifying, and determining the level of pest populations in a timely manner.

**Threshold:** Pest population level that requires control action.

**WIN-PST (Windows Pest Screening Tool):** A pesticide environmental risk screening tool that NRCS field office conservations, extension agents, crop consultants, pesticide dealers and producers can use to evaluate the potential for pesticides to move with water and eroded soil/organic matter and affect non-target organisms.

\* **Cornell Pest Management Guidelines for Commercial Tree Fruit Production** also includes nutrient management recommendations.

### ***Background***

Fruit growing regions are often located on well drained soils and upland slopes near lakes and rivers where there is a substantial risk of soil erosion and runoff or leaching of pesticides and fertilizers into water resources. Therefore, it is important that farming practices protect these water resources by limiting erosion and preventing nutrient and pesticide runoff and leaching.

Fertilization and irrigation programs should minimize offsite nutrient losses and maintain soil nutrients within an optimal range. Applications of nitrogen or phosphorus to orchards should be managed according to crop need following the **Cornell Pest Management Guidelines for Commercial Tree Fruit Production\***. Cover crops or permanent ground cover should also be used in the orchard to assist in the uptake of excess nitrogen, reduce nutrient runoff, and reduce erosion of soils. The system used to manage weed competition for nutrients and water in orchards influence not only the growth, physiology and yield of trees, but also soil and water quality in the surrounding ecosystem.

Integrated Pest Management (IPM) methods protect the tree and its fruit from weeds, insects and diseases using ecologically and economically sound management practices. This is achieved by careful consideration and implementation of all appropriate pest management options. Practices are chosen that will enhance safeguards to the environment and human health while minimizing the use of agrochemicals. Priority is given to cultural, biological, and genetic management practices.

The New York apple industry is developing an Integrated Fruit Production (IPF) program that has value to be used along with this worksheet. Combined with Good Agricultural Practices (GAP) and IPM, a wealth of informational resources is available to orchardists to produce fruit in both an environmentally friendly and safe manner, and capture markets that seek “most friendly practices.”

**Agricultural Water Quality Principle:** Practices that reduce the potential of nutrients, sediment and pesticides entering nearby waterbodies should be employed in the production of Tree Fruit.

## AEM for Tree Fruit

Management Practices	Lower Risk.....1	2	3	Higher Risk.....4
<p><b>How is nitrogen applied to established orchards?</b></p> <p>(This question applies only to apples for fresh consumption)</p>	<p>Nitrogen applications are based on soil analysis at least once every three years, leaf tissue analysis and tree growth AND applications do not exceed Cornell Guidelines.</p>	<p>Nitrogen applications are based on soil analysis AND applications generally do not exceed the Cornell Guidelines.</p>	<p>Nitrogen applications are based on soil analysis.</p>	<p>Nitrogen applications are not based on soil analysis.</p>
<p><b>How is nitrogen applied to established orchards?</b></p> <p>(This question applies to apples for process and other tree fruits)</p>	<p>All soil N is applied before or at bud break. Split applications are used.</p>		<p>More than half of N is applied in fall with remainder applied in spring.</p>	<p>All N applied in fall.</p>
<p><b>How is nitrogen applied to new orchards?</b></p>	<p>Nitrogen applications are based on soil analysis AND do not exceed Cornell Guidelines of four ounces of Calcium Nitrate (or equivalent of nitrogen) per tree.</p>			<p>Nitrogen applications are not based on soil analysis AND may exceed Cornell Guidelines.</p>
<p><b>What method of nitrogen application is used?</b></p>	<p>Nitrogen is directed into the herbicide strip.</p>			<p>Nitrogen is broadcast onto herbicide and sod strips.</p>

<p><b>How is phosphorus applied to new orchards?</b></p> <p><b>(Phosphorus is not needed on established orchards)</b></p>	<p>Phosphorus applications are based on pre-plant soil analysis AND applied and incorporated into the soil the year before planting</p>	<p>Phosphorus applications are based on pre-plant soil analysis AND incorporated into the soil.</p>		<p>Phosphorus applications are not based on soil analysis.</p>
<p><b>How is ground cover managed?</b></p>	<p>A dense groundcover of at least 3 varieties of dwarf grasses is established and managed through mowing.</p>		<p>Groundcover is established but is not dense enough to hold wet season equipment traffic.</p>	<p>Ground cover is not established, alleys are tilled throughout the growing season to control weeds.</p>
<p><b>How do you monitor pest populations in your tree fruit crops?</b></p>	<p>Scouting for pests is routinely done AND Cornell Pest Management Guidelines for Commercial Tree Fruit Production is used to determine thresholds.</p>	<p>Regional pest alerts are used to monitor population trends of insect pests AND scouting is done to verify.</p>	<p>Scouting is done but established pest thresholds are not followed.</p>	<p>Little or no scouting of pest activity occurs.</p>
<p><b>Do you keep records of pest monitoring and management activities?</b></p>	<p>Records are kept of all pest monitoring and management practices, including cultural, biological and chemical controls.</p>	<p>Records are kept only of chemical pest management controls.</p>		<p>Records of pest monitoring and management practices are not kept.</p>

<p><b>What criteria are used for pesticide selection?</b></p>	<p>Pesticide selections are made with consideration of efficacy, environmental risk (assessed by a resource professional using WIN-PST), restricted re-entry interval, and preservation of the natural enemies of the specified pest and days to harvest.</p>	<p>Pesticide selections are made with consideration of efficacy, consultation with a crop professional on environmental risk, restricted re-entry interval, and preservation of the natural enemies of the specified pest and days to harvest.</p>	<p>Pesticide cost and efficacy are considered when making pesticide selections.</p>	<p>Only product cost is considered when making pesticide selections.</p>
<p><b>What type of canopy sprayer is used?</b></p>	<p>Application equipment is used that increases target deposition (i.e. reduces drift) and allows for a reduction in the amount and/or rate of pesticides used (e.g. tunnel sprayer, sensor sprayer, tower sprayer, directed deposition sprayer).</p>	<p>Application equipment is used that improves deposition and reduces drift (e.g. airblast sprayer with low drift nozzles such as air induction nozzles, modified airblast sprayer with deflectors, nozzle orientation adjusted to improve deposition).</p>		<p>The application equipment does not address drift (e.g. an unmodified airblast sprayer).</p>
<p><b>Are the selected nozzles appropriate for use? Are they replaced when worn?</b></p>	<p>Appropriate size nozzles are chosen. For canopy sprays, 150-200 micron nozzles are recommended. This is known as a “fine” spray classification <b>AND</b> nozzles are replaced when more than 10% inaccurate.</p>	<p>Appropriate size nozzles are chosen. For canopy sprays, 150-200 micron nozzles are recommended. This is known as a “fine” spray classification, <b>BUT</b> nozzles are not replaced when more than 10% inaccurate.</p>		<p>Nozzle size is not appropriate for canopy sprays.  <i>AND</i> Nozzles are not replaced when worn or damaged.</p>

<p><b>Is the canopy sprayer calibrated properly to ensure good coverage without over application?</b></p>	<p>Sprayer is serviced and calibrated before the start of each season.  <i>AND</i>  Sprayer is recalibrated for major growth stages.  <i>AND</i>  Application is monitored electronically to measure proper speed and flow rate.</p>	<p>Sprayer is serviced and calibrated before the start of each season.  <i>AND</i>  Sprayer is recalibrated for major growth stages.</p>	<p>Sprayer is serviced and calibrated before the start of each season.</p>	<p>Calibration is done infrequently or not at all.</p>
<p><b>Are environmental conditions considered before deciding to spray?</b></p>	<p>No spraying is done if winds are &gt;10 mph unless using a sprayer that is designed/modified to improve deposition and reduce drift.</p>	<p>Most of the time spraying is not done if winds are &gt;10 mph unless using a sprayer that is designed/modified to improve deposition and reduce drift.</p>		<p>Spraying is done in conditions where significant drift will occur.</p>
<p><b>Is the sprayer tank cleaned after use to remove all pesticides?</b></p>	<p>Inside and out of sprayer tank is rinsed in situ and is sprayed in the orchard after each spraying.</p>	<p>Sprayer tank is washed occasionally and is sprayed in the orchard.</p>	<p>Sprayer tank is rarely rinsed and it is done in the farmyard.</p>	<p>Sprayer tank is not rinsed.</p>

<b>Is the canopy sprayer and tractor maintained properly?</b>	Sprayer and tractor are serviced annually in addition to necessary repair work. Routine maintenance is conducted after the conclusion of each application.	Sprayer and tractor are serviced annually in addition to necessary repair work.		Sprayer and tractor are not serviced annually. Service occurs only when equipment breaks.
<b>Is pruning done in a way to control disease and increase tree air circulation?</b>	Wood infected by significant amounts of over wintering fungi is pruned off annually to minimize sources of inoculums AND to improve tree air circulation.	Wood infected by significant amounts of over wintering fungi is pruned off every two years to minimize sources of inoculums AND to improve tree air circulation.	Wood infected by significant amounts of over wintering fungi is pruned off every three years to minimize sources of inoculums AND to improve tree air circulation.	Pruning is done without regard to the presence of over wintering inoculums or air circulation.

**Comments:**

1. Are orchard site selections based on slope, soil type and drainage?
2. Does your post-harvest pest management plan follow Cornell Pest Management Guidelines for Commercial Tree Fruit Production?
3. Is Phosphorus applied to established orchards?  
If yes, under what conditions is it applied?
4. Has someone from your farm been trained in IPM or does the farm use a service employing IPM principles?
5. Do you utilize the NYS Elements of IPM (Integrated Pest Management) to assist with your pest management decision making?  
<http://nysipm.cornell.edu/elements/default.asp>

**NOTE:** You must also complete all applicable Core worksheets (e.g. irrigation water management, pesticide storage and use, soil management, etc)