Guide to IPM Elements and Guidelines

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Contents

1. Introduction

We will always be faced with pests – those living organisms that interfere with our pursuit of life, livelihood and happiness to the extent that action is called for. History teaches us that we must act carefully, for our attempts to manage pests have resulted in undesired, serious and life-threatening consequences to humans, other organisms and our environment.

Integrated Pest Management, or IPM, is a science-based decision-making process that identifies and reduces hazards from both pests and pest management-related strategies. IPM users employ knowledge of pest biology, information about the environment and specially designed techniques and technology to prevent unacceptable hazards to people, property, resources and the environment.

While many tactics used against pests throughout history are compatible with an IPM approach, IPM was formalized in the 1970s and continues to be enhanced to meet the challenge of keeping pests and pest damage to acceptable levels while minimizing collateral damage.

IPM can be practically defined for a specific arena, such as a crop and region, by cataloging the IPM practices that are available for that setting. For example, IPM for apple production in New York includes using time-tested techniques such as placing monitoring traps in apple trees in early July to determine if apple maggot flies are present in sufficient numbers to justify the cost of applying an insecticide. Using mating disruption for codling moth, which involves releasing pheromone throughout the orchard to prevent mating with a goal of reducing the need for insecticides, is another practice. Compiling a list of these and all other IPM tactics available to the NY apple grower provides a practical, working definition of IPM.

IPM Elements and Guidelines (Figure 1) are concise presentation of IPM practices applicable to a specific environment. These environments can include a specific crop and region, or a non-agricultural environment such as

a school, golf course or residential lawn. IPM Elements and Guidelines are efficient resources for determining which practices are available and recommended by land-grant university scientists and other stakeholders. Elements and Guidelines answer the question, "What practices will help me benefit from IPM in my home, work or school environment?"

The goal of this document is to explain the significant role that IPM Elements and Guidelines play in advancing and supporting IPM adoption, and provide guidance to those developing and using these tools.

These lists of IPM practices are meant to complement production guides or similar publications that provide comprehensive "how to" information for IPM and other practices. IPM Elements and Guidelines list the practices. Production guides describe in detail when the practice is most appropriate, how it can be implemented and how results can be evaluated.

Other names for IPM practice lists include IPM protocols, checklists, standards and definitions. A variety of formats and approaches are used. Many of these assign point values to each practice, facilitating use as a performance assessment tool. Point values can be assigned based on a practice's priority and/or degree of difficulty, with high priority or more challenging practices receiving greater point values. Priorities can be determined based on the importance of the practice for effective pest management and/or potential to reduce unintended impacts.

Excel worksheets have been used in some cases to generate scores automatically (Figure 2). In addition to point-based elements, these documents may also include minimum requirements or practices that must be in place to achieve a passing score. They may also include supporting information, such as a list of pests considered and a list of cited references.

IPM Elements and Guidelines are typically created by a broad stakeholder group including Extension, researchers, growers, crop advisors and others, and are published by a Land-Grant university and/or state lead agency such as a department of agriculture. They often include additional Best Management Practices (BMPs) that improve conservation in areas such as water, soil and nutrient management. While not strictly meeting the definition for IPM, these additional practices may impact pests or pest

management. For example, excessive nutrient use can aggravate aphid problems in some crops.

The number of Elements and Guidelines are growing (Appendix A). A current compendium is maintained at http://www.ipmcenters.org/ipmelements/index.cfm.

In addition, a directory of non-governmental IPM eco-label programs that require IPM for participation can be found at http://www.ipminstitute.org/links.htm. A number of these programs use tools similar to IPM Elements and Guidelines to qualify producers and service providers for certification. Other programs use more general standards or criteria that simply indicate that IPM is required, or indicate that general IPM practices are required such as use of thresholds for key pests where available. Participants in these programs can use IPM Elements and Guidelines to document their performance of specific practices recommended for their working environment.

Figure 1. First page of the Elements of IPM for Fresh Market Sweet Corn in New York State developed in 2001 (nysipm.cornell.edu/elements/fmswcorn.asp).

NEW YORK STATE Integrated Pest Management PROGRAM

Cornell University Cooperative Extension

Elements of IPM for Fresh Market Sweet Corn in New York State

MAJOR PESTS		
Insects	**Diseases**	**Weeds**
European corn borer	common rust	broadleaves
corn earworm	smut	annual grasses
fall armyworm	northern corn leaf blight	perennials
corn flea beetle	Stewart's wilt	
corn leaf aphid	anthracnose	
western corn rootworm	maize dwarf mosaic	
seed corn maggot	seed rots	
cutworms	barley yellow dwarf virus	
common armyworm		
sap beetles		

A. Site Preparation	Priority	Points	Acreage Goal	Achieved
1) Review weed map/list of fields to choose appropriate weed control strategies. See the Weed Assessment List available for use in satisfying this element.	M	5	50%	2.5
2) Crop Rotation. Plant only in fields where sweet or field corn has not been grown in the previous year to avoid corn root worm, anthracnose, smut, and northern corn leaf blight				
a. Fields harvested before Aug. 15:	L	3	25%	
b. Fields harvested after Aug. 15:	H	10	75%	
3) Soil test at least every three years; fertilize according to recommendation	H	10	100%	
B. Planting				
1) Use tolerant or resistant varieties whenever possible for controlling common rust, smut, and Stewart's wilt, NCLB, maize dwarf mosaic, barley yellow dwarf	M	5	25%	
2) Seed treatment. Use fungicide treated seed or biological seed treatment for control of root and seed rots.	H	10	100%	

1

Crop and geographic scope.

Listing the major pests lets the reader assess how closely these match up with pests at their location.

In this case, users can receive five points for implementing this element on 50% of their acreage.

In this example, practices are prioritized by importance. Users earn more points for practices that are more likely to improve health, environmental or economic impacts.

The user enters points scored, e.g., this practice was completed on 25% of the producer's total acreage.

Points allow developers to signal priority or level of difficulty, and users the flexibility to pick and choose practices that fit their operation.

Nutrient management practices are included. Although not typically considered an IPM practice, nutrient management addresses water quality concerns and can also impact pest populations, e.g., excessive nitrogen can sometimes flare aphid populations.

Figure 2. Excerpt from a Microsoft Excel worksheet for sweet cherry elements for New York. Percent score (row two) is calculated automatically after all questions are answered "yes" or "no". (http://nysipm.cornell.edu/elements/SweetCherryIPMElements.xls).

Elements of IPM for Sweet Cherries in New York State

80% of the Sweet Cherry IPM Elements points qualifies a crop as "IPM-grown."
IPM Elements provide a basis for self-assessment of your IPM practices.

Percent of the IPM Elements points earned, based on answers in column D:	
Total IPM Elements plus Bonus points earned, based on answers in column D:	
Total possible IPM Elements points, not including Bonus points:	**102**

Orchard Location _____ Acres _____

Grower Name and Address _____

Grower Signature _____ Date _____

Assess the sweet cherry IPM elements practiced in your orchards.

Soil and Nutrient Management and Cultural Practices	**Points Available**	**Points Earned**	**Enter YES or NO**
1. A water quanity and placement plan that minimizes disease development, optimizes water use, and minimizes erosion and runoff is used.	4		
2. Fertilizer recommendations are based on soil and leaf analysis. Balance nitrogen with tree growth to eliminate fall growth. (**Choose only one and enter in yellow box.**)	In the yellow cell, type A, B, or C or select from the drop-down list.		
A. Soil and leaf analysis conducted every year.	5		
B. Soil and leaf analysis conducted every 2 years.	4		
C. Soil and leaf analysis conducted every 3 years.	3		
3. Pruning should be done annually for bacterial and cytospora canker control. Prune as close to bloom as possible or immediately after harvest (within two weeks).	3		
Pesticides and Pesticide Records	**Points Available**	**Points Earned**	**Enter YES or NO**
Only pesticides registered in the state and approved for the target pest and crop will be used. Records of pesticide applications including date, field identification, targeted pest, pesticide name and EPA number, formulation, rate, and number of acres treated are maintained.			
1. Insecticide/fungicide sprayer is calibrated at least once a year.	5		
2. Herbicide sprayer is calibrated at least once a year.	5		
3. Spray records are maintained and organized.	7		
4. Among pesticides of comparable efficacy, the one with the lowest EIQ value (farmworker safety, natural enemies, etc.) is selected.	3		
Disease Management	**Points Available**	**Points Earned**	**Enter YES or NO**
1.The application of fungicides for blossom blight and brown rot are based on disease models, including weather and disease pressure (cherries are most susceptible to infection from bloom to pit hardening and 3 weeks preharvest to harvest).	5		
2. Different fungicide chemistries are used for blossom blight sprays and for fruit rot to reduce resistance.	5		
3. For cherry leafspot, weather conditons are monitored and severity of leaf infection is determined by Table 28 in Cornell Guidelines.	5		
4. For other diseases (bacterial canker, powdery mildew, Phytophthora, etc.) cultural control tactics are employed to reduce severity (water management, pruning timing, brush removal, etc.) and sprays are applied only when appropriate.	5		
Arthropod Management (Insect and Mites)	**Points Available**	**Points Earned**	**Enter YES or NO**
Arthropod monitoring methods and thresholds should conform to state IPM program guidelines. Records should be kept of all monitoring information collected and threshold used.			

2. Using Elements and Guidelines

The first document in the growing series of crop and region-specific IPM Elements and Guidelines was published by Boutwell and Smith in 1981 in the Bulletin of the Entomological Society of America. These authors developed this practice list as a tool to assess the level of adoption of IPM in cotton in Alabama. Since then, more than 75 sets have been developed for crops ranging from alfalfa in Ohio to wine grapes in Massachusetts to macadamia nuts in Hawaii.

IPM Elements and Guidelines have been used by growers, crop advisors and other educators for a variety of purposes including:

- Identifying additional IPM and other conservation practices appropriate for their crop and region, i.e., "Are there new practices that may be worth experimenting with on my own or my clients' farms?"
- Assessing how many of the available practices are in use on a specific farm or field, i.e., "Where does my operation sit along the IPM continuum from basic to advanced IPM practices?"
- Documenting the extent of IPM adoption to relay that information to others including buyers and government incentive programs, i.e., "We've worked hard to implement IPM on our farm and here's how we measure up."

Researchers have used these documents to:

- Measure IPM practice adoption over time or across programs or regions.

- Help identify which practices have low adoption and thus may need work to improve utility or benefits to growers.
- Identify opportunities for research such as thresholds or cultural practices needed for specific pests.

Conservation program administrators including NRCS professional staff have used these documents to:

- Identify practices that may be eligible for incentives or technical assistance.
- Assess performance and qualify producers for incentive and technical assistance programs including the Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP).

Buyers of products and services have used IPM Elements and Guidelines to:

- Establish collaborative programs with suppliers to implement and document reductions in potential impacts of production on health, environment and economics.
- Assess supplier performance.
- Set a minimum threshold for performance to qualify suppliers and products for purchases.

IPM has emerged as a key requirement for market-based programs with more than 28 million US food and fiber-production acres enrolled and 233 million worldwide (IPM Institute 2008). IPM Elements and Guidelines can support comprehensive practice standards such as Food Alliance, the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System, or Rainforest Alliance's Standards for Forest Management or SYSCO's IPM/Sustainable Ag Program. These standards and programs require participants to implement IPM along with a broad range of other best practices but do not necessarily detail which IPM practices should be in place. Using IPM Elements and Guidelines in conjunction with these programs can help document that the user is aware of the IPM practices available and has implemented a substantial number of them.

Buyers' use of these tools for assessing supplier performance or to make claims to consumers has not been without controversy. Concerns include potential for creating false impressions about practices and performance by non-participating producers. Concerns have also been raised about Extension involvement in market-based programs, including drawing distinctions among producers on the basis of IPM performance and potentially alienating growers not yet using IPM who might benefit the most from a supportive relationship with Extension IPM professionals.

For more information

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IPM Institute of North America. 2008. IPM and Sustainable Ag Certifiers Experience Continued Growth in 2007. *IPM in the Marketplace* 9:1 http://www.ipminstitute.org/newsletter/newsletter_v9i1.htm

Rainforest Alliance. 2008. *Generic Standards for Assessing Forest Management*. www.rainforest-alliance.org/forestry/documents/generic_standards.pdf

UMass Extension. 2000. Why Partners with Nature? Addressing Consumers' Concerns. www.umass.edu/umext/ipm/ipm_projects/education/partners_with_nature.html

US Green Building Council. 2008. LEED Rating Systems. www.usgbc.org/DisplayPage.aspx?CMSPageID=222

3. Developing IPM Elements and Guidelines: A Step-by-Step Guide

Developing a set of IPM Elements or Guidelines is an educational process in itself. Typically a need is identified, resources are obtained, and an initial draft is prepared and then presented to a broad group of stakeholders for feedback. The draft is refined through a series of iterative drafts and finally published. Periodic updates are advisable to keep these documents current to address new pests and best practices. By engaging in this process, needs are often identified including issues requiring additional research, or practices requiring more education to increase awareness and implementation.

Step 1. Identifying the need

When developing a set of these guidelines, first ask, Why is it needed? What purposes and which user groups will it serve? Are there similar documents from other regions or for related crops that already exist and might be adapted to meet the need? Answering these questions can provide guidance for subsequent steps including selecting a format and identifying stakeholders.

Typical reasons for developing Elements and Guidelines:

- Educate pest managers and pesticide users about IPM practices available to them.
- Qualify producers for market incentives such as access to existing or new markets.
- Help identify research, extension and other needs and priorities by comprehensively assessing IPM tactics available.
- Provide an assessment tool for NRCS staff to help determine grower eligibility for technical assistance and incentive programs.

Step 2. Securing resources
Resources required can include expert, stakeholder and administrative support time; travel to development meeting(s); overnight accommodations; meeting space and audiovisual equipment; refreshments; telephone and conference calls; postage; and office supplies. A variety of sources have supported these needs:

- In-kind contributions of time by both experts and stakeholders, and meeting space by hosts with a vested interest including Extension, producer groups, state agency employees and university personnel.
- Funding from grants including USDA CSREES IPM Program grants, USDA NRCS Conservation Innovation Grants, US EPA Strategic Agriculture Initiative and US EPA Pesticide Environmental Stewardship Program.

You can save money by combining development meetings with other related meetings, such as annual producer association meetings. Some documents have been developed without in-person meetings, although group interactions can be very beneficial to the process.

Step 3. Refine your geographic and subject scope
Over what geographic area might the same list of practices generally apply? Is there potential to create a tool that will be useful in more than one state? Conversely, a large state or states with highly diverse climates, cropping systems and/or pest complexes may require different sets to cover each unique zone.

Similar crops or crops within a cropping system or rotation might be considered for inclusion in one tool. For example, Rutgers Cooperative Extension has published *IPM Guidelines for Cucumbers, Melons and Summer Squash* as a single document (www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/melon.htm).

Nearly all IPM Elements and Guidelines to date have addressed all key pests for the designated crop and setting including insects, diseases, weeds, vertebrates and nematodes. Most have also included IPM-related practices

(such as nutrient management) that can affect pest management and reduce unintended consequences.

Step 4. Identify relevant experts and stakeholders

A diverse working group can help ensure adequate input to generate a consensus document that represents the best thinking of and earns the support of all stakeholders. These stakeholders may participate in the stakeholder meeting (Step 7) if you choose to hold one, and/or provide input on drafts, assist with outreach, etc. Draw researchers, educators, growers and other participants from:

- Universities
- Industry
- Extension
- NRCS
- US EPA
- State lead agency (e.g., Department of Agriculture)
- Producers
- Producer associations
- Key buyers
- Crop consultants
- Environmental advocacy organizations
- Input suppliers

Consider all potential uses of the tool and include those users in the development process if possible. Consider identifying one or more key participants to help with the steps immediately following this one, including formatting and drafting a preliminary list of practices.

Step 5. Review potential formats and issues, and develop your recommendation(s)

Formats range from text-based documents to spreadsheets. To familiarize yourself and/or your initial development group with potential formats, see the directory at http://www.ipmcenters.org/ipmelements/index.cfm.

To speed the development process, review potential uses for the Guidelines and hone in on a format beforehand. Some formatting issues to consider:

- Assigning a point value to each practice is one mechanism for highlighting more important or more challenging practices, which might "earn" the user more points. Guidelines with points can serve as performance assessment tools, especially in combination with a designated "minimum score" or threshold for earning a passing grade or other incentive.
- Using a point-based approach that allows practices to be scored as "not applicable" can help accommodate differences in pests and other conditions. For example, if one area within the geographic scope of the tool does not experience problems with a particular pest, practices specific to that pest can be scored as not applicable and not affect the user's overall score.
- A set of minimum or prerequisite practices can identify those which are most important to implement, or so basic as to be a *de facto* requirement. These might include meeting minimum record-keeping or pesticide applicator certification or licensing requirements that are important for users to be aware of and should not be optional.
- Several IPM Elements or Guidelines include a "percent of production" component. This device allows points to be scored or a practice to be considered implemented even if all of the subject production is not included. For example, a user might be rewarded with points for an advanced practice that may be more expensive to implement, even if that practice is only in place on 50% of the production. Alternatively, percent of production can be used as a multiplier so that if 75% of the production has the practice in place, the user can earn 75% of the available points.

Step 6. Draft preliminary document

Relevant experts can accelerate the development process by producing an initial draft list of practices. Place this list within the recommended format to further speed the process. While taking these steps, continue to seek stakeholder input on additions or revisions to the draft. To ensure a sense of ownership and to generate buy-in among the development group, present any draft document as subject to discussion and revision as needed.

Step 7. Call a stakeholder meeting

An in-person meeting, while not essential, can be extremely valuable. Reserving a day or the better part of a day for an informed group to work together will improve concentration, focus and ability to generate solutions to conflicts that will satisfy at least the majority of potential users and other stakeholders.

The agenda should include reviewing the need for the document, how the need was identified, additional uses, goals for the development process and the tool, surveying existing tools and formats, and discussing any other steps taken prior to the meeting, including developing an initial practice list, selecting a format and/or development of a draft for discussion.

Other agenda items can include brainstorming additional practices, settling on a final format, and a line-by-line review of the draft. Breakout sessions can be helpful especially for extensive documents and can be organized around pest type (e.g., insects, diseases, weeds).

The group at a stakeholder meeting can, and should, represent a very diverse degree of knowledge of IPM. Some participants may hold advanced degrees in aspects of pest management and be considered experts. Others are often practical users of IPM information and still others may have primary knowledge of marketing or regulation. It is incumbent on the meeting facilitator to try to bridge some of these differences and recognize the value each area brings to the proposed document. Successful documents will be developed by groups that are not dominated by vocal pest management "experts" or "practical users" but rather achieve a balance of views and a consensus.

Step 8. Refine your document

Prior to the meeting, or as soon as possible after the meeting, provide a draft to those not able to attend for their review and comment, even if the draft is rough and includes significant gaps. Asking for feedback from key non-participants in the meeting can help reduce rework and increase buy in.

You will have specific follow up actions after the meeting to pursue answers to questions generated at the meeting, incorporate input from non-

participants, etc. To avoid losing momentum, complete this work and circulate a revision to your development group for additional comments while the subject matter is fresh. Provide a specific deadline for input on any drafts circulated for comment.

Consider including a list of references including production guides and fact sheets that provide more detail on how to implement practices listed in the document. Acknowledge any foundation documents you might have adapted and sources of funding. Include a publication or revision date so that those using your document are aware of how old the document is and can cite it properly.

Step 9. Finalize and publish

Finalize your document and publish it on your program's website. Consider submitting the document to the IPM Centers website (www.ipmcenters.org) for posting or linking to your site to increase visibility and awareness. To avoid confusion over multiple versions of the same document, consider asking anyone interested in posting the document, e.g., producer associations, to link to your original posting rather than posting a separate document.

IPM programs in Hawaii, Massachusetts, New Jersey, New York and Ohio have compiled sets of IPM Elements or Guidelines on their websites and included introductory pages with directories and explanatory information.

Step 10. Create awareness and train users

Placing short articles about the new tool in the communications that you or your development group publishes is a good way to increase awareness of the tool and provide "how to" information. Articles should include the rationale for the tool, how it can be accessed and used and any unique features. Acknowledge participants and funders.

IPM Elements and Guidelines can be readily adapted for additional practices, self-assessment and other basic uses, especially by those who are familiar with best practices for the related subject area. Production guides and fact sheets should serve as supplements. For other applications, and for users with little exposure to IPM or other IPM resources, more extensive training will likely be required. These users can include USDA Natural Resources

Conservation Service staff who may need both basic general and crop-specific IPM training. Workshops have been developed to provide this training in some cases.

Step 11. Keep your document current

To remain relevant, the tool will need to be kept up-to-date. For example, new pests may emerge and others diminish in importance, new tactics may be developed and others become obsolete. Scheduling a review by key experts every one to three years can help identify aspects that might need updating.

For more information

IPM Protocols for Hawaii - www.extento.hawaii.edu/IPM/

IPM Guidelines for Massachusetts - www.umass.edu/umext/ipm/guidelines/index.html

IPM Guidelines for New Jersey - www.pestmanagement.rutgers.edu/IPM/Vegetable/guidelines.htm

Elements of IPM in New York - nysipm.cornell.edu/elements/default.asp

Elements of IPM in Ohio - ipm.osu.edu/element/index.htm

Murray, K. 2008. Checklist for Organizing NRCS/IPM Farm Tour and Workshop. neipmc.org/nrcs/resources/checklist_for_organizing_nrcs-ipm_workshop.pdf

4. Elements and Guidelines in NRCS Programs

The USDA Natural Resources Conservation Service (NRCS) provides agricultural producers with technical assistance and incentives aimed at protecting our environment. Resource concerns addressed by NRCS programs include soil, water, air, plants and animals plus humans (SWAPA+H).

NRCS is staffed by resource management and conservation specialists. Unlike Extension or crop advisors, NRCS professionals do not make recommendations on inputs such as pesticides and fertilizers. Rather they guide producers through the conservation planning process, which involves determining general and site-specific resource concerns, and identifying practices with potential to affect those resources.

This planning process involves determining general and site-specific resource concerns, and identifying practices with potential to impact those resources. Streams, lakes and ponds adjacent to production sites, and wellheads with potential to carry runoff into groundwater are examples of site-specific resource concerns. Pesticide and nutrient applications are two practices with potential to negatively affect those resources.

Mitigation measures are then developed to protect vulnerable resources. These measures might include cover crops to reduce soil erosion and take up excess nutrients, or buffer or filter strips to reduce pesticide runoff into ground or surface water.

In addition to the assistance described above, NRCS also administers natural resources and agricultural programs. The Environmental Quality Incentives Program (EQIP) and the Conservation Stewardship Program (CSP, formerly the Conservation Security Program) are two NRCS programs that provide

technical assistance with planning and financial incentives to producers who implement conservation practices. As part of these programs, producers must implement a number of basic practices and may earn higher incentive payments for additional practices. The great majority of assistance provided through these programs has been for practices other than pest management. Manure and nutrient management have been broadly supported by these programs in many states and across many production systems, particularly livestock and row crops.

New collaborations between NRCS and IPM professionals in a growing number of states are extending the benefits of EQIP and CSP to IPM. NRCS professionals are increasingly employing IPM Elements and Guidelines to identify practices that may be eligible for incentives, and to assess producers for eligibility to participate in and earn higher incentives through EQIP and CSP.

Two working groups funded by the USDA Regional IPM Centers have developed tools specifically designed to facilitate this use. Members of the Northeast Vegetable IPM Working Group have developed several tools including a calculator for tallying EQIP incentive payments for sweet corn IPM practices and a planning guide sheet that facilitates IPM plan development from a list of IPM practices for vegetable crops. Determining the cost of each practice or set of related practices is a key need for NRCS as they use IPM Elements and Guidelines to determine incentive and cost-share rates.

Significant changes can occur in EQIP, CSP and other farm-bill programs which each new farm bill. NRCS state offices generally have a degree of flexibility in implementing these programs within your state. By working with NRCS staff in your state, substantial improvements can be made in accessibility to these programs to support IPM. IPM and NRCS professionals in states that have made considerable progress, including CA, CT, MA, ME, MI, PA and WI, are available and willing to share information on how this process has worked in their states. See also the Northeast and North Central working group websites listed below for resources and contacts.

For more information

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Appendix A. Directory of Elements and Guidelines by State

IPM Protocols for Hawaii - Published by University of Hawaii's IPM Program

Banana
www.extento.hawaii.edu/IPM/Certification/banana/default.asp
Macadamia Nut
www.extento.hawaii.edu/IPM/Certification/mac/default.asp
Pineapple
www.extento.hawaii.edu/IPM/Certification/Pineapple/default.asp
Sugarcane
www.extento.hawaii.edu/IPM/Certification/Sugarcane/default.asp

IPM Guidelines for Massachusetts - Published by University of Massachusetts Extension

Apple
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_apple.html
Blueberry, Highbush
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_blueberry.html
Cole Crops
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_cole_crops.html
Cranberry
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_cranberry.html
Pepper (1999)
www.umass.edu/umext/ipm/guidelines/insect_management_in_peppers.html
Poinsettia
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_poinsettia.html
Potato
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_potato.html
Pumpkin & Squash
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_pumpkins.html
Raspberry
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_raspberry.html
Strawberry
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_strawberry.html

Sweet corn
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_sweetcorn.html
Tomato, Field
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_field_tomatoes.html
Tomato, Greenhouse
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_greenhouse_tomatoes.html
Wine Grapes
www.umass.edu/umext/ipm/guidelines/ipm_guidelines_wine_grape.html

IPM Guidelines for New Jersey - Published by Rutgers Cooperative Extension

Beets
www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/beet.htm
Cabbage
www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/cabbage.htm
Carrots
www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/carrot.htm
Cauliflower

www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/cauliflower.htm
Cucumbers, Melons and Summer Squash
www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/melon.htm
Peas
www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/pea.htm
Peppers
www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/pepper.htm
Pumpkins and Winter Squash
www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/squash.htm
Snap Beans
www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/Bean.htm
Sweet corn
www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/sweet_corn.htm
Tomatoes
www.pestmanagement.rutgers.edu/IPM/Vegetable/IPMGuidelines/tomatoe.htm

Elements of IPM in New York - Published by Cornell University's New York State IPM Program

Alfalfa and Field Corn (2000)
nysipm.cornell.edu/elements/alfcorn.asp

Apples (2004)
nysipm.cornell.edu/elements/apple/default.asp
Asparagus (2001)
nysipm.cornell.edu/elements/asp.asp
Beets (2002)
nysipm.cornell.edu/elements/beet.asp
Blueberries (2000)
nysipm.cornell.edu/elements/blueb.asp
Brussels Sprouts (2001)
nysipm.cornell.edu/elements/bsprouts.asp
Cabbage (2002)
nysipm.cornell.edu/elements/cabbage.asp
Carrots (2002)
nysipm.cornell.edu/elements/carrot.asp
Cauliflower (2001)
nysipm.cornell.edu/elements/caul.asp
Cucumber, Melon and Summer Squash (2001)
nysipm.cornell.edu/elements/ssmelcuke.asp
Dry Beans (2001)
nysipm.cornell.edu/elements/drybean.asp
Grapes (2007)
nysipm.cornell.edu/elements/grapes.asp
Greenhouses
nysipm.cornell.edu/elements/ghouse.asp
Lettuce (2001)
nysipm.cornell.edu/elements/lettuce.asp
Onions (2004)
nysipm.cornell.edu/elements/onions.asp
Peas (2002)
nysipm.cornell.edu/elements/pea.asp
Peppers (2005)
nysipm.cornell.edu/elements/peppers.asp
Potatoes (2003)
nysipm.cornell.edu/elements/potato.asp
Raspberries (2000)
nysipm.cornell.edu/elements/raspb.asp
Snap Beans (2002)
nysipm.cornell.edu/elements/snapbean.asp
Strawberries (2000)
nysipm.cornell.edu/elements/strawb.asp
Sweet Cherries (2000)
nysipm.cornell.edu/elements/swcherry.asp

Sweet Corn, Fresh Market (2001)
nysipm.cornell.edu/elements/fmswcorn.asp
Sweet Corn, Processing (2002)
nysipm.cornell.edu/elements/prswcorn.asp
Tomatoes, Fresh Market (2001)
nysipm.cornell.edu/elements/fmtom.asp
Tomatoes, Greenhouse (2001)
nysipm.cornell.edu/elements/ghtom.asp
Winter Squash and Pumpkin (2001)
nysipm.cornell.edu/elements/wspump.asp

Elements of IPM in Ohio - Published by Ohio State Extension

Alfalfa
ipm.osu.edu/element/alf.htm
Apple
ipm.osu.edu/element/apple.htm
Cabbage
ipm.osu.edu/element/cabbage.htm
Carrot
ipm.osu.edu/element/carrot.htm
Cherry
ipm.osu.edu/element/cherry.htm
Corn, Field
ipm.osu.edu/element/corn.htm
Corn, Sweet
ipm.osu.edu/element/sweet.htm
Cucumber (Pickles)
ipm.osu.edu/element/pickle.htm
Lettuce
ipm.osu.edu/element/lettuce.htm
Peach
ipm.osu.edu/element/peach.htm
Pear
ipm.osu.edu/element/pear.htm
Pepper
ipm.osu.edu/element/pepper.htm
Plum
ipm.osu.edu/element/plum.htm
Potato
ipm.osu.edu/element/potato.htm
Radish
ipm.osu.edu/element/radish.htm

Residential Turfgrass
ipm.osu.edu/element/resturf.htm
Snap Bean
ipm.osu.edu/element/snapb.htm
Soybean
ipm.osu.edu/element/soy.htm
Squash and Pumpkin
ipm.osu.edu/element/pumpkin.htm
Tomato, Processing
ipm.osu.edu/element/tomato.htm
Wheat
ipm.osu.edu/element/wheat.htm