

A Call for Projects in Integrated Pest Management For Agriculture



**NYSIPM Projects in Agriculture, 2012
- Research and Implementation -**

Deadline: Monday, May 7, 2012, 5:00 p.m.

NYSIPM Projects in Agriculture, 2012

In 2012, the NY State IPM Program (NYSIPM) seeks proposals to address the following high priority needs in Agricultural IPM in NY.

Fruit

- Assessment of the distribution of streptomycin resistant *Erwinia amylovora* causing fire blight in New York orchards.
- Evaluation of developmental rates and voltinism in brown marmorated stink bug in New York fruit crops.
- Spatial and temporal dynamics of spotted wing Drosophila in small fruits, stone fruit and wild hosts in New York.
- Research on alternatives to metalaxyl in grape production

Vegetables

- Addressing Phytophthora blight issues related to 2011 ENY flooding
- Developing scouting and threshold recommendations for brown marmorated stink bug in sweet corn
- Weed management schools for organic vegetable farmers

Ornamentals

- Use of compost and microbially-based products for greenhouse disease suppression
- Successful management of the invasive weed Mugwort in nursery production and retail settings
- Evaluation of effects of planting sites and conditions, including Phytophthora root rot, on Fraser fir production
- Research on alternatives to imidacloprid in sod production

Field Crops

- Economic evaluation of fungicide applications impact on plant health and potential fungicide resistance management issues.
- Education for CCE staff and growers on herbicide resistance, making use of the Weed science Society of educational modules and/or other resources.
- Produce online educational modules for Soybean IPM

Livestock

- Dairy IPM outreach, including pasture fly management.

In addition, funding may be available for other IPM priorities as described in Appendices A-D.

Proposal instructions follow.

NYSIPM Projects in Agriculture, 2012 - Research and Implementation -

The New York State Integrated Pest Management (NYS IPM) Program helps New York farmers and other citizens to address pest problems in ways that minimize environmental, health, and economic risks through the use of innovative biological, cultural, and technological practices. Integrated pest management is science-based and is implemented through Cornell Cooperative Extension staff and many others.

The NYSIPM Program invites grant proposals from campus-based faculty and staff, Cooperative Extension educators, off-campus extension staff, private consultants, and members of grower groups interested in initiating, developing, evaluating, or demonstrating the feasibility of IPM methods. All IPM projects must show how actual or potential changes in the adoption of IPM practices were measured and should expand outreach and adoption.

The NYSIPM Projects in Agriculture focus on one-year deliverables

For only the second time since 2003 a NYS IPM Agricultural grants program will be offered. Since we are uncertain if funding for the grants program will be continued in 2013, proposals for 2012 that achieve a measurable impact in one year will be given priority. Continuation of the grants program in 2013 will depend on the amount of funding provided to the NYS IPM Program in the 2013-2013 budget year.

Two Types of Projects

1) Implementation Projects

Leaders of implementation projects usually a) take proven IPM methodologies and put them into practice in commercial settings; b) hold educational workshops; or c) develop educational materials. Implementation proposals regularly include participation by producers, Extension personnel, private crop consultants, and relevant Cornell staff. For the most recent NYSIPM Agricultural RFAs (2002 and 2003), implementation grants averaged \$2,567 each. Requests should be for less than \$8,000.

2) Research and Development Projects

A research and development project advances the understanding of IPM methods such as pest monitoring or forecasting, biological controls, cultural controls, resistant varieties, behavior-modifying chemicals, and least-toxic pesticides. Projects need to focus on accelerating the movement of new research findings to the implementation or demonstration phase. For the most recent NYSIPM Agricultural RFAs (2002 and 2003), research grants averaged \$6,303 each. Requests should be for less than \$8,000.

Priority will be given to proposals that:

- 1) Provide a clear plan for measuring project impact (R&D and Implementation);
- 2) Demonstrate or investigate innovative pest management approaches that minimize environmental, health, and economic risks (R&D and Implementation);
- 3) Widely disseminate results among producers and other audiences (Implementation);
- 4) Involve active participation of producers, consultants, and field representatives (R&D and Implementation);
- 5) Include direct or in-kind financial contributions from producers (R&D and Implementation);
- 6) Address the commodity priorities attached to this RFP (R&D and Implementation);
- 7) Are technically feasible within the proposed time frame (R&D and Implementation);
- 8) Have a realistic and justifiable budget. (R&D and Implementation);
- 9) Indicate a plan for implementing the results (R&D);

10) Show linkage to on-going IPM implementation/demonstration projects (R&D).

Other Funding Sources

The level of funding for NYS IPM grants is relatively small . Grants of longer duration and higher funding levels are available through the Northeast IPM Regional Center, NE-SARE, AFRI, several EPA programs, and other government programs and private foundations.

Proposal Evaluation

The Agricultural IPM Program has a working group for each commodity area -vegetables, ornamentals, livestock/field crops, and fruit. Working group members include faculty and Extension staff, private consultants, and growers. Each working group evaluates proposals, assigns a rank and a recommended budget, and then forwards proposals to the IPM Executive Committee for a final decision.

Membership of the IPM Executive Committee includes representatives from the NYS Department of Agriculture and Markets and from the New York State Department of Environmental Conservation, the associate director of Cornell Cooperative Extension, the Experiment Station Directors or their associates, and the IPM co-directors. The IPM Executive Committee either accepts or modifies the recommendation of the commodity working groups. The IPM co-directors notify and engage in any final negotiation with the grant recipient. If a budget adjustment is made, the project leader has the option of accepting the new budget with changes or not accepting the award.

General Funding Criteria

- 1) Degree to which the proposal addresses the IPM priorities listed above.
- 2) Degree to which the proposal addresses working group priorities. See the attached.
- 3) Qualifications and experience of personnel on the grant.
- 4) Likelihood of project success.
- 5) Potential for impact.
- 6) Creativity and originality.
- 7) Follows required format. Only proposals following the required format will be considered.

Required Proposal Format

Proposals that are not in the required format may have their rating adjusted downward during evaluation.

The maximum length for any proposal is **three pages, single-spaced**. Use Times or Palatino 12-point font ; 1-inch page margins and print on 8.5 x 11-inch paper.

Project type:

State EITHER:

1) "Implementation

OR

2) "Research and Development"

Title: Short title that could be understood by someone without a scientific background.

Project Leader(s): List all project leaders and their professional affiliation

Cooperator(s): List only those cooperators who have agreed to participate in the project.

Abstract (no more than 100 words): Write a short abstract that could be understood by someone without a scientific background.

Background and Justification: Summarize pertinent IPM efforts, the need for the project, and producer interest. Describe how the project addresses commodity and IPM priorities.

Objectives: Write a concise series of numbered statements that define the objectives of the project. Include “Project Evaluation” as one of the objectives.

Procedures: Provide a procedure to correspond with each objective. Outline the essential working plans and methods to be used to attain each objective. For the procedure corresponding to “Project Evaluation,” describe your plan to evaluate the success of the project. The success of the project may occur in the short-term (e.g., adoption of a new IPM tactic) or may take longer based on research conducted (e.g., new knowledge of biological agents lays the foundation for future alternative strategies).

Expected Outcomes/Impacts: In one to two paragraphs concisely describe the ultimate expected outcomes/impacts of this work and how you plan to achieve the outcomes. Examples of outcomes/impacts include:

- number of producers and acres the project will impact.
- economic benefit of project to producers
- reduction in risk to the environment and/or health
- measurable improvement of water quality
- measurable reduction in pesticide drift

Budget: Provide a dollar value for each budget category even if zero.

Wages, Salaries: Funds cannot be used for wages for secretarial support or similar staff. Only wages for work on the project objectives are allowed. Do not include fringes. Describe how wages/salaries will be used (e.g., support a summer assistant to conduct research).

Supplies: Include description.

Travel: Include details.

Total request:

Expected matching contributions from producers or others (not required):

Current or pending contributions from other similar grant proposals:

The Cornell/State Contract for IPM does not allow indirect costs.

Submitting Proposals and notification of funding

Only electronic copies of proposals are accepted. Submit an electronic copy in .pdf format to jlg2@cornell.edu

Deadline for receipt of proposals is **Monday, May 7, 2012, 5:00 p.m.**

Proposals selected for funding will be announced in May 2012.

Questions and Contacts

PI's are strongly encouraged to discuss potential proposals with the appropriate IPM staff member. Contact one of the following individuals if you have questions related to implementation or research proposals.

Fruit

Chair: Greg English-Loeb, Entomology, Geneva, 315 787-2345, gme1@cornell.edu

Coordinator: Juliet Carroll, IPM Geneva, 315-787-2430, jec3@cornell.edu

IPM educator: Tim Weigle, (716) 792-2800 ext 203, thw4@cornell.edu

Livestock/Field Crops

Chair: Russell Hahn, 238A Emerson, 607 255-1759, rrh4@cornell.edu

Coordinator: Keith Waldron, IPM Geneva, 315 787-2432, jkw5@cornell.edu

Ken Wise, ENY, 518 434-1690, klw24@cornell.edu

Ornamentals

Chair: Margery Daughtrey, Plant Pathology, LIHRL, Riverhead, 631-727-3595, mld9@cornell.edu

Coordinator: Elizabeth Lamb, IPM Ithaca 607 254 8800, eml38@cornell.edu

Brian Eshenauer, WNY, 585 461-1000 ext 240, bce1@cornell.edu

Vegetables

Chair: Steve Reiners, Hort. Science, Geneva, 315 787-2311, sr43@cornell.edu

Coordinator: Abby Seaman, WNY, 315-787-2422, ajs32@cornell.edu

Report requirements

The leader of a funded project is required to file a report to the NYS IPM Program by December 15, 2012. Details regarding report formats, lengths, etc will be provided in the future. Leaders of projects are also requested to report their results at appropriate industry meetings. It is expected that when reporting on results (e.g., presentations, proceedings, peer reviewed publications) of this work that the NYS IPM program will be acknowledged as the source of funding.

****NOTE:** The highest priorities are listed on page 2. Additional projects may be funded if resources allow.

Appendix A: Fruit IPM Priorities

Based on input from grower stakeholders, Cornell Cooperative Extension Educators and Cornell University Faculty. Edited November 2011 by the Fruit IPM Working Group.

Tree Fruit	Rank
Evaluation of sprayers, drift, canopy management and coverage issues.	1
Brown marmorated stink bug biology & management	2
Fungicide & bactericide resistance management	3
Development and testing of alternative materials and non-pesticide options for pest and crop management	4
Apple scab management in wet years	5
Insecticide & miticide resistance management and monitoring	6
Replacements for organophosphates, carbamates, pyrethroids	7
Obliquebanded leafroller biology and management	8
Internal lepidoptera biology and management	9
Fire blight management	10
Flyspeck & sooty blotch and summer fruit rot biology and management on apples	11
Postharvest decay and mycotoxin management	12
Development of web-based decision support systems	13
Develop Integrated Production Management - IFP	14
Interaction between herbicides (especially glyphosate) and plant health	15
Dogwood borer biology and management	16
Woolly apple aphid biology and management	17
X-disease and Tomato ringspot virus (ToRSV) biology and management on stone fruits	18
Pheromone mating disruption effectiveness	19
Weed biology and management in orchards	20
Bacterial canker biology and management on stone fruits	21
Apple scab ascospore maturity	22
Fire blight management of shoot blight phase	23
Integrated management of phytophagous mites & conservation of predatory mites	24
Tarnished plant bug biology and management	25
Groundwater-risky products: replacement or other options	26
Abandoned orchards as reservoirs for pests	27
Integrated management of phytophagous mites	28
Stink bug biology and management	29
Organic production methods	30
Plant bug & mullein bug biology and management	31
Fabraea leaf spot biology and management on pear	32
Pesticide phytotoxicity on stone fruit	33

Grape	Rank
Grape berry moth biology and management alternatives	1
Invasive species biology, management and impact on IPM	2
Development and testing of alternative materials and non-pesticide options, including resistant varieties	3
Evaluation of sprayers, canopy management and fruit coverage issues	4
Sour rot & bitter rot complexes, biology and management	5
Powdery mildew biology and management	6
Fungicide resistance management	7
Downy mildew biology and management	8
Botrytis bunch rot biology and management	9
Low-input or organic methods	10
Integration of biological & chemical controls	11
Optimization of spray inputs for disease management	12
Environmentally sound and economically feasible controls that will improve or maintain quality	13
Row-middle weed management (cover crops)	14
European red mite biology and management	15
Economic injury in relation to wine/juice quality	16
Asian lady beetle wine taint prevention	17
Phomopsis biology and management	18
Environmentally sound and economically feasible weed management	19
Insecticide resistance management	20
Black rot biology and management	21
Crown gall biology and management	22
Asian lady beetle biology and management	23
Strategies for use of sulfur and copper	24
Under-row weed management to preserve suckers	25
Vertebrate management: deer, turkeys, birds	26
Biology & management of viral diseases (e.g. grape leaf roll and tomato ring spot)	27

Berry Crops	Rank
Spotted wing drosophila biology and management in berry crops	1
Tarnished plant bug biology and management on strawberries and brambles	2
Sap beetle biology and management in strawberry and brambles	3
IPM in high tunnels	4
Weed management in all berries	5
Bird management	6
Strawberry: herbicides, decline, and soil health	7
Development and testing of alternative materials and non-pesticide options	8
Root weevil and scarab beetle biology and management in strawberry	9
Economic thresholds for leaf spot, leaf scorch & powdery mildew on strawberry	10
Replant problems on strawberry and raspberry	11
Slug management in strawberries	12
Japanese beetle biology and management	13
Organic production methods	14
Cyclament mite in strawberry	15
Two-spotted spider mites in strawberry & raspberry	16
Black root rot on strawberry	17
Viruses in blueberries	18
Winter injury management on raspberry, blackberry and blueberry	19
Anthracnose biology and management on strawberry	20
Mummy berry biology and management on blueberry	21
Cranberry fruit worm and cherry fruit worm biology and management on blueberry	22
Plastic mulch disposal issues	23
Biodegradable mulches during establishment	24
Phomopsis biology and management on blueberry	25
Crown borer biology and management in brambles	26
Raspberry cane borer biology and management	27
Imported currant worm biology and management on Ribes	28
Currant aphid management on Ribes	29
Cane blight in red raspberries	30

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Appendix B: Vegetable IPM Priorities

(Rank: H=high, M=medium, L=low)

Multiple Crop Priorities: Field Production

Implementation Priorities:

- H Alternative weed management techniques such as interseeding, new cultivation tactics, and banding of herbicides
- H Demonstrate new biological and biocompatible control measures, including practices for organic systems, that look promising in replicated experiments.
- H Demonstrate pest management benefits of improved and calibrated application equipment.
- H Demonstrate the benefits of seed treatments for insect and disease management.
- M Demonstrate to growers how to effectively make use of the previous season's weed population information when planning rotations, tillage and herbicide options for the following season weed control program.
- H Evaluate IPM programs developed in other states. Refine and adapt them for NY.
- H Improve and expand weather-based insect and disease forecasting models.
- H Demonstrate the use of cover crops for disease and weed management.
- H Using more exacting plant fertility measurements, demonstrate improved plant resistance to pests in crops appropriately fertilized and encourage implementation of these tools.
- H Demonstrate effective management practices for plant-parasitic nematodes.

Research Priorities:

- H Use of mulches, including no-till and killed, rotational strategies and other alternative practices for improved soil quality and weed control in vegetable cropping situations.
- H Maximize effectiveness of pesticides through evaluation of application equipment.
- H Develop decision systems for diseases and insect pests that are based on weather data and compatible with the currently owned electronic weather sensors.
- H Preventative measures for disease control such as rotation, cultural practices and avoidance.
- H Optimize pesticide efficacy evaluations by timing treatments based on action thresholds.
- H Management of root rot and nematode diseases.
- H Improve our understanding of which are the most important natural enemies and how insecticides and biotech products may affect them.
- H Evaluate new biological and biocompatible control measures including practices for organic systems.
- H Evaluate new biotech products.
- H Improve flea beetle management tactics, especially for organic systems.
- H Seed treatments to control seed maggots, flea beetles, other insects and diseases
- M Slug biology and management.
- M Influence of environmental factors on the efficacy of aerial sprays for insect control.
- H Breeding to improve insect and disease management.
- H Investigate the use of cover crops for disease and weed management.

Multiple Crop Priorities: High Tunnel/Greenhouse Production

Implementation Priorities:

H Promote adoption of biological control of thrips and two spotted spider mites in high tunnel crops.

Research Priorities:

H Improve and refine two spotted spider mite management with biological control in passively heated structures.

M Improve and refine thrips management with biological control in passively heated structures.

Crucifers (cabbage, cauliflower, broccoli)

Implementation Priorities:

H Demonstration and evaluation of biological control (including natural enemies and pathogens) and assessment of the effects of presently used insecticides on natural enemies.

H Black rot management information dissemination

Research Priorities:

H see multicrop weed management

H Evaluation of biological control (including natural enemies and pathogens) of Lepidopteran pests, aphids, and maggots - especially for those insects where insecticide resistance is a concern.

M Development of alternative control tactics for root maggots including use of pathogens, host plant resistance, seed coating and adult trapping.

H Disease control in storage cabbage

H Breed for and evaluate varieties for pest (insects and disease) resistance alone or in combination with other bio-based practices.

H Improve management strategies for thrips in cabbage and work with growers and companies to incorporate such into commercial production.

M Evaluate swede midge management techniques for organic production

M Evaluate Alternaria head rot management techniques in organic cauliflower

Cucurbits (Field)

Implementation Priorities:

H Continue with cucurbit IPM implementation including recommendations for resistant varieties.

H Assess the extent of powdery mildew resistance to fungicides

H Demonstrate some documented strategies for Phytophthora blight management

Increase grower awareness and use of downy mildew tracking and forecasting (PIPE)

H Demonstrate and increase grower awareness of seed treatment technology for striped cucumber beetle management.

Research Priorities:

H Continue interdisciplinary research on diseases and insect pests including evaluation of resistant varieties

and biocompatible pesticides.

H Develop strategies for managing Phytophthora Blight

M Determine strategies for control of bacterial diseases (bacterial wilt, leaf spot and angular leaf spot) of cucurbits.

M Develop striped cucumber beetle management strategies for organic production.

M Develop downy mildew management strategies for organic production.

Cucurbits (High Tunnel)

Implementation Priorities:

H Promote adoption of powdery mildew resistant cucumber varieties.

Research Priorities:

H Striped cucumber beetle management in high tunnel cucumbers

M Downy mildew management in high tunnels.

M Improve and refine grafting for soil borne disease management

M Powdery mildew management for zucchini and summer squash grown in high tunnels

M Pollinator management in high tunnel cucurbits.

Dry Beans

Implementation Priorities

H Trapping and scouting for western bean cutworm to determine need for control.

Research Priorities

H Investigate biology and management (including action thresholds) for western bean cutworm.

Greens (High Tunnel)

Implementation Priorities:

H Promote adoption of downy mildew and Fusarium resistant spinach varieties.

H Promote adoption of downy mildew resistant lettuce varieties.

H Educate growers on the importance of controlling warm season pests prior to winter greens crops.

H Promote adoption of biological control of cool weather mites that attack winter greens.

Research Priorities:

H Screen for aphid resistant greens varieties.

H Spray options (organic and conventional) for pest control in low temperature settings.

H Investigate the effects of temperature and photoperiod on natural enemies for control of aphids and mites in high tunnel greens.

H Management of cabbage worms on brassica greens.

M Management of rodents (voles and mice) in high tunnel greens and root crops.

Onions and other Alliums

Implementation Priorities:

- H Demonstrate benefits of rotations for pest control, e.g. weeds and onion maggot.
- H Continuation of implementation projects to increase adoption of IPM techniques including but not limited to the use of the onion thrips threshold and the use of Blight Alert.
- H Demonstrate an efficient program for detecting thrips susceptibility to commonly used insecticides.
- H Demonstrate management of black rot (*Aspergillus niger*) and neck rot (*Botrytis allii*) from field to storage
- H Demonstrate best management practices for management of garlic bloat nematode, including seed certification

Research Priorities:

- M Investigate biology of black rot (*Aspergillus niger*) and neck rot (*Botrytis allii*) from field to storage
- H Evaluate onion varieties for resistance to onion maggot, Botrytis leaf blight, onion thrips and other pests.
- H Investigate new seed treatments for onion maggot or thrips.
- H Investigate ecology of onion thrips, onion maggot and their natural enemies for improved management.
- H Investigate biology and management of bacterial pathogens.
- L Investigate biology and management of Iris Yellow Spot Virus.
- M Investigate biology and management of leek moth.
- M Investigate cover crops for suppressing soilborne insects and bacterial diseases.
- H Develop best management practices for garlic bloat nematode.

Peppers

Implementation Priorities:

- M Demonstrate Phytophthora blight best management practices.
- M Improve European corn borer management in peppers.

Research Priorities:

- M Develop best management practices for Phytophthora blight
- M Breed for resistance to disease and insect pests

Potatoes

Implementation Priorities:

- H Screen varieties for leafhopper resistance.
- H Demonstrate cultural practices such as rotation, cull management, scouting seed tubers as late blight management tactics
- H Demonstrate and increase grower adoption of late blight forecasting.
- H Improve grower awareness of resistance management strategies for CPB.
- H Demonstrate the benefits of seed cutting and suberization for seed decay management.

Research Priorities:

- H Evaluation of integrated management of silver scurf and Colletotrichum black dot, including seed treatments, storage treatments, rotation and disease suppressing cover crops, fungicides, and other options.

M Necrotic virus management strategies in potatoes.

H Tuber blight management strategies including organic strategies (seedpiece treatments and post harvest strategies)

M Breeding potatoes for resistance to multiple pests including Colorado potato beetle, potato leafhopper, aphids, late blight, early blight, Verticillium wilt, leafroll and other diseases.

H Develop information for improving late blight forecasts.

Snap beans

Implementation Priorities:

Research Priorities:

H Alternatives to fungicide applications for white and gray molds.

H Develop improved management tactics for European corn borer.

H Bean virus biology and management.

H Leaf hopper control for organic production.

M Elucidation of etiology and epidemiology of Phytophthora capsici in snap beans.

Sweet Corn

Implementation Priorities:

H Demonstrate alternative control tactics for worm pests including biologicals, biotech plants, and biorational insecticides and compare their impact on important natural enemies.

L Demonstrate management tactics for corn flea beetle, the vector of Stewart's wilt.
Improve grower success with grass weed management.

H Demonstrate effective bird management strategies.

Research Priorities:

H See multicrop weed management

H Development of action thresholds for rust on late-planted and highly susceptible varieties.

H Refinement of fresh market sweet corn IPM protocols, including relationship between trap counts and field infestations for corn started under plastic

L Breeding for resistance to multiple pests including "worms" and diseases.

M Screening of existing varieties for resistance.

H Screening of corn earworm for insecticide resistance

H Investigate biology and management (including action thresholds) of corn earworm and its potential to overwinter in NY

H Evaluate Bt corn lines for horticultural performance and pest control under NY conditions.

M Corn leaf aphid management through varietal resistance, threshold development, optimal insecticide use and evaluation and conservation of natural enemies.

H Investigate biology and management (including action thresholds) of brown marmorated stink bug

H Investigate biology and management (including action thresholds) of western bean cutworm.

H Develop effective bird management strategies.

Field Tomato

Implementation Priorities:

- H Demonstrate bacterial disease management strategies.
- M Demonstration projects using TOMCAST forecasting system
- H Demonstration projects using late blight forecasting system

Research Priorities:

- H Investigate control of bacterial diseases - speck, spot, and canker.
- H Determine the integration of newer fungicides (non-strobilurin) for foliar disease (early and late blight) using TOMCAST.
- H Develop information for improving late blight forecasting in tomatoes.
- M Develop strategies for managing Phytophthora blight
- H Breeding for disease resistance

High Tunnel/Greenhouse tomato

Implementation Priorities:

- H Promote the use of Fulvia fulva (brown leaf mold) resistant varieties.
- M Demonstrate benefits of pruning for disease and insect/mite control.
- M Demonstrate the benefits of ventilation, pruning and plant density as disease management tools.
- M Demonstrate the benefits of between-row mulch for control of mites, Sclerotinia and weeds.
- M Demonstrate the benefits of powdery mildew resistant varieties.

Research Priorities:

- H Screen for Fulvia fulva (brown leaf mold) resistant varieties (both determinate and indeterminate).
- H Identify effective spray materials for Fulvia control on susceptible varieties (both organic and conventional).
- H Develop cultural controls for tobacco mosaic and cucumber mosaic virus.
- H Develop techniques for prevention of ant damage in high tunnel tomatoes.
- M Identify effective materials for Botrytis management.
- M Develop cultural control techniques for Botrytis gray mold.
- M Develop techniques for Sclerotinia management in high tunnel tomatoes.
- M Identify effective, labeled materials with short PHIs for early blight management in high tunnel tomatoes.
- M Identify effective, labeled materials with short PHIs for late blight management in high tunnel tomatoes.

****NOTE:** The highest priorities are listed on page 2. Additional projects may be funded if resources allow.

Appendix C: Ornamentals & Sod IPM Priorities

All Ornamental Commodities

1. Documentation of the pest management, economic and environmental impact of IPM, including the gathering of baseline data
2. Development of electronic tools and software to assist in pest management activities
3. Development and demonstration of wildlife management techniques
4. Diagnosis and description of newly emerging pest problems affecting ornamental crops
5. Development and application of Best Management Practices (BMPs) and IPM Elements (see <http://www.nysipm.cornell.edu/elements/>) to promote environmental stewardship by commercial growers

Greenhouse-Grown Flowers, Vegetables and Herbs & Outdoor-Grown Herbaceous Ornamentals

1. Development of IPM strategies and resources for pest management in greenhouse crops including cut flowers, potted plants, herbaceous perennials, herbs, and vegetable crops and transplants
 - a. Management of insect pests, particularly thrips, aphids, and whiteflies, and the diseases they vector.
 - b. Management of mites, especially study of confounding influences such as newer pesticides being used for other arthropods in the greenhouse
 - c. Management of root zone problems (especially high soluble salts, fungus gnats, Pythium root rot, and Thielaviopsis)
 - d. Management of foliar disease issues
2. Development of: diagnostic tools; new or refined cultural methods for pest prevention; physical or mechanical approaches for management of greenhouse pests, including weeds, insects, diseases and vertebrates; and computer programs to aid in decision making and record keeping
3. Biological control trials for efficacy and cost-effectiveness of beneficial insects and microbial products
4. Transfer of knowledge to stakeholders through workshops, new fact sheets and other printed materials, and development of electronic media such as websites, grower listserves, and online courses
5. Development of IPM strategies and resources for production of field-grown cut flowers.

Nursery-Grown Ornamentals & Christmas Tree Production

1. Investigation and practical application of relationships between woody plant phenology and pest management, including modeling host plant susceptibility; predicting pest emergence, incidence and severity; and incorporation into weather-based forecasting systems (e.g. NEWA at <http://newa.nysaes.cornell.edu/>) as well as training materials
2. Development of IPM strategies and resources for pest management in nursery and Christmas tree crops
 - a. Development of training materials on pest biology in relationship to pest management
 - b. Development of biorational approaches to pest management
 - c. Development of procedures for pest scouting and sampling
 - d. Development of thresholds for plant quality, physiological health, and survival
 - e. Investigation of interactions between abiotic stress and pest management
3. Selection and evaluation of resistant/tolerant plant varieties to environmental and biotic stresses (pathogens, insects, mites, deer, voles, etc.)
4. Development and evaluation of new strategies for weed management, including use of alternative techniques and products

Sod Production

1. Development of IPM strategies for use of biological methods in the control of diseases (including nematodes), weeds, and insects
2. Development of IPM strategies for use of cultural methods in the control of pests
3. Assessment of disease and insect resistance among turfgrass cultivars
4. Development of IPM strategies using relationships between soil quality and turfgrass health
5. Developing application technologies for reducing the risks associated with pesticides (e.g., reducing groundwater contamination, personal exposure, etc.)
6. Establishment of safety parameters for sod pesticides (e.g. non-target effects, environmental impact quotients)
7. Evaluation of turfgrass species and cultivars with superior competitive ability because of growth habit, tolerance of difficult growing conditions, and/or production of allelopathic chemicals
8. Investigation of pest biology and incorporation into predictive weather-based models, such as NEWA (<http://newa.nysaes.cornell.edu/>)

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Appendix D: Livestock/Field Crop IPM Priorities

I. Implementation (High Priority)

A. General

- * provide thorough documentation of program impacts
- * coordinated involvement of CCE / IPM staff, faculty, and multipliers, where appropriate
- * linkage to ongoing educational and research programs

B. In Depth Educational Programs

- * document increased IPM competence of individual growers, consultants, and agribusiness personnel

C. On Farm IPM Component Demonstrations

- * document location-specific economic and environmental impacts of critical biological, cultural, or least toxic IPM methods in side-by-side comparison with conventional practice

D. County Pilot Programs

- * evaluate scouting and integrated management strategies for new or emerging pests and/or commodities (e.g., small grains, soybean, biofuel feedstocks, stored commodities, livestock) on multiple farms

II. Multidimensional Demonstrations (High Priority)

A. General

- * improve grower awareness and confidence in comprehensive IPM strategies (cultural, biological, least toxic/reduced pesticide/ and/or organic) that minimize impact of **all** major pests in production system while optimizing net profitability and environmental impact
- * strong linkage to ongoing research and educational programs including integrated management of:
 - flies and external parasites of dairy cattle and poultry
 - weeds, insects, and diseases of corn-based cash crop rotations
 - weeds, insects, and diseases of corn/alfalfa-based dairy rotations

III. Research and Development (High Priority)

A. General (Short term, potential for significant pesticide reduction)

- * commodity/pest priorities are listed below based on current or anticipated widespread application of pesticides against these targets and / or potential economic losses associated with insect, disease, weed and vertebrate pests
- * successful projects should indicate a likelihood for significant reductions in pesticide usage or potential reductions in pest related economic losses in 2-3 yr. if results are implemented
- * priority will be given to integrated, multi-authored proposals that will enhance our understanding of the efficacy and economic impacts of cultural, biological, and/or least toxic approaches for management of target pests

B. Integrated Management of Significant Pests Affecting Dairy Cattle

- * fly pests affecting animals in barns (house and stable) or on pasture (face and horn)
- * external parasites (cattle lice and mange mites)
- * research on organically approved methods for control of dairy nuisance and biting fly pests

C. Integrated Management of Significant Pests Affecting Field Corn

- * pesticide resistance management strategies against weed, disease and insect pests of field corn
- * annual and perennial broadleaf and grass weeds (including herbicide resistant species)
- * foliar disease issues in field corn (northern corn leaf blight and gray leafspot)
- * determine the value (disease control, yield and economic return) of foliar fungicides
- * evaluation of risk potential and impacts of new invasive or exotic pests such as western bean cutworm
- * slug issues in field corn
- * evaluation of potential pest risks associated with use of cover crops and green manures
- * Research on organic weed control methods

D. Integrated Management of Significant Pests Affecting Alfalfa (& Grass Mixtures)

- * potato leafhopper and alfalfa weevil
- * annual and perennial broadleaf and grass weeds (including herbicide resistant species)
- * currently under-managed diseases (leaf blights, root and crown rots, brown root rot)
- * determine the value (disease control, yield and economic return) of foliar fungicides

E. Integrated Management of Significant Pests Affecting Wheat

- * foliar fungal disease complex of wheat (Stagonospora nodorum blotch, Septoria tritici blotch, tan spot, powdery mildew, leaf rust, stripe rust)
- * determine the value (disease control, yield and economic return) of foliar fungicides applied at different growth stages
- * integrated management of Fusarium head blight to reduce levels of deoxynivalenol
- * survey of corn and other commodities in NYS for different mycotoxins and genetic variability (for toxin production) in populations of mycotoxigenic fungi
- * virus diseases (yellow dwarf, aphid vectors, wheat spindle streak mosaic, soilborne wheat mosaic)
- * cereal leaf beetle of wheat and oats

F. Integrated Management of Significant Pests Affecting Soybean

- * determine the value (disease control, yield and economic return) of foliar fungicides
- * integrated soybean aphid management
- * evaluation of alternative chemical, cultural, and biocontrol methods for management of white mold
- * weed control methods including those appropriate for organic soybeans
- * virus diseases (especially soybean vein necrosis and thrips vectors)

G. Integrated Management of Significant Pests Affecting Poultry

- * flies, external parasites, and other arthropod pests affecting poultry

H. Integrated Management of Significant Pests Affecting Switchgrass and other Bioenergy Feedstocks

- * Evaluate potential resistance in varieties or use of polyculture for management of prevalent diseases and insect pests of perennial grasses
- * switchgrass diseases (smut, rust, leaf blights)
- * Weed management in the establishment of perennial grasses

IV. Research and Development (Secondary Priority)

A. General (long term and/or limited potential for pesticide reduction)

- * commodity/pest priorities are listed below based on current or anticipated economic impact and the current lack of effective control
- * priority will be given to integrated, multi-authored proposals that will enhance our understanding of the efficacy, economic and environmental impacts of cultural, biological, and/or least toxic strategies for management of target pests

B. Long Term Research with Potential for Significant Pesticide Reduction

- * development of methods to manage pests listed as high priority, but with future implementation estimated at 4 or more years

C. Integrated Management of Significant Pests Affecting Dairy Cattle

- * cattle grubs, other arthropod pests and poisonous/noxious plants affecting cattle on pasture
- * fly pests affecting animals on pasture (horse and deer flies)
- * research to enhance management of pasture fly pests such as natural enemies, dung beetles and traps
- * vertebrate (bird, rodent) management in/ around dairy facilities

D. Integrated Management of Significant Pests Affecting Field Corn

- * European corn borer, armyworm, cutworm, and wireworm
- * seedling diseases in stand establishment
- leaf blight diseases (northern leaf blight, gray leaf spot, anthracnose, eyespot, and northern leaf spot)
- * stalk rot diseases (anthracnose and Gibberella stalk rots)
- * toxigenic molds in grain and silage

E. Integrated Management of Significant Pests Affecting Forage Legumes (& Grass Mixtures)

- * alfalfa snout beetle
- * clover root curculio/*Fusarium* complex
- * leaf & stem blight complex (especially spring black stem & leaf spot and *Leptosphaerulina* leaf spot)
- * *Sclerotinia* crown and stem rot
- * brown root rot of alfalfa
- * *Fusarium* wilt of birdsfoot trefoil
- * fundamental pest survey and impact assessment of forage grass foliar diseases and insect pests.

F. Integrated Management of Significant Weed problems in Field Crop Systems

- * improve efficacy, economics, and information on weed control methods including those appropriate for organic

G. Integrated Management of Significant Pests Affecting Wheat

- * varietal resistance to soilborne viruses in winter wheat
- * develop / evaluate management strategies for stripe rust of wheat
- * pest survey for wheat soilborne mosaic virus

H. Integrated Management of Significant Pests Affecting Soybean

- * fundamental pest survey and assessment
- * varietal and cultural management of *Sclerotinia* stem rot and *Phytophthora* rot.
- * varietal and cultural management of Soybean vein necrosis virus

I. Integrated Management of Significant Pests Affecting Poultry

- * insect pests destructive to poultry housing structures
- * vertebrate (bird, rodent) management in/ around poultry facilities

J. Integrated Management of Significant Pests Affecting Pastures

- * fundamental insect, disease, weed, and vertebrate pest survey and assessment

K. Integrated Management of Significant Pests Affecting Oats

- * fundamental pest survey and assessment
- * assessment of current status of cereal leaf beetle and it's natural enemies

L. Integrated Management of Vertebrate Pests affecting Field Crop Production

- * fundamental pest survey and assessment
- * integrated management to minimize impact of white tail deer on forages
- * integrated management to minimize impact of birds (and other mammals crows, turkeys, etc.) on grain crops

M. Integrated Management of Significant Pests Affecting Stored Commodities

- * fundamental pest survey and assessment of pests affecting stored grains and silage
- * innovative pest control methods for stored commodities