Objective 1. Publish a *Northeast Vegetable and Strawberry Pest Identification Supplement* that expands the *New England Pest Identification Supplement* to include insects, diseases, weeds and non-pathogenic disorders of vegetables and strawberries for the full Northeast region.

The Pest Identification Supplement will be a field IPM tool that will enable growers to identify pests more accurately and make appropriate and timely decisions on pest management. The process of creating and using such a guide will also enhance communication among vegetable specialists in the region.

4a. Problem, Background and Justification

The vegetable industry in the Northeast consists of at least 12,000 farms that cultivate and harvest over 370,000 acres of vegetables (2002 Census of Agriculture). These figures do not include potatoes, strawberries, or greenhouse vegetable crops, which are important components on many vegetable farms. Farms range is size from 1 acre to >2000 acres, and vegetables are marketed in various ways -- for processing, through wholesale distributors or direct to supermarkets, as well as retail through farmstands, farmers markets, and Community Supported Agriculture. Relative to field crops, vegetables have high value per acre, with gross value ranging from about $1500 per acre for wholesale processing vegetables to >$30,000 per acre for intensively grown fresh market crops. Thus, as land values increase and farmers seek higher value crops with direct market potential in order to sustain their farms, farmers often turn from other commodities to vegetable production. Quality demands are high, and effective pest management is essential to meet market demand. Integrated pest management, when implemented through an on-farm monitoring program, has proven that it saves money, reduces health and environmental risks and provides effective control of pests.

The Northeast Vegetable IPM Working Group (Vegetable IWG) was established in 2002 under the umbrella of the Northeast Pest Management Center. The group represents diverse types of vegetable farmers, as well as consultants, University, state agency, and other agricultural professionals from the Northeast Region (see Attachment A, 2006 membership list). The group has met annually from 2002 to 2005, and has been actively engaged in defining and tackling priority needs. Several Vegetable Working Group projects have been funded by the Northeast IPM Center, including a vegetable IPM resource database, a regional Sweet Corn Pest Management Strategic Plan, and a project which is building stronger collaboration with Natural Resources Conservation Service personnel and programs to increase the use of IPM on vegetable farms. This proposal seeks to follow through with additional components of the latter project, and undertake two new projects that meet priority needs identified by the working group.

At our 2005 meeting, which took place November 29-30 in Harrisburg PA, we reexamined our mission and goals, and defined them as follows:

Mission Statement.

The mission of the Northeast Vegetable IPM Working Group is to foster the development and use of IPM as a means to achieve ecological and economic sustainability of vegetable farms in the Northeast.

Goals of the Northeast Vegetable IPM Working Group

1. Identify and prioritize regional vegetable and strawberry IPM needs, in particular gaps in research, extension and regulation.
2. Represent the views of vegetable and strawberry farmers and other stakeholders to the Northeast IPM Center.
3. Develop, facilitate or implement appropriate research and educational projects that address work group priorities.
4. Strengthen partnerships and exchange of information among vegetable farmers, agricultural professionals, and other stakeholders throughout the Northeast region.

We adhere to definitions of IPM and the goals expressed in the National IPM Roadmap and the IPM Center's mission statement.

Need for Pest Identification Supplement.

The majority of vegetable growers in the region make pest management decisions without the benefit of a crop consultant or Extension agent who can walk the field with them (or for them), to help identify what insect, disease, or weed might be there. They have to make their own call on what the problem is and how to manage it. Yet, timely and correct identification of the pest is critical to proper selection of pesticides and cultural practices to address the problem. Many vegetable growers are highly diverse, with over 50 different crops, each with its own set of pests.

A Vegetable Working Group priority that has been reaffirmed at every meeting is to serve the needs of small or isolated operations and highly diversified farms where monitoring services are not available, with the goal of growers being able to accomplish IPM independently. We also seek to serve the needs of farmers in more concentrated crop production areas where crop diversity may be lower and pest conditions may be more intense as a result. Further, it is out goal to encourage the application of IPM methods to enhance the success of organic farming systems. This project will address a critical need of all these audiences.

While web resources are very important, growers need informational tools they can hold in their hand, keep in the truck, and take to the field. They are so busy during the growing season that a computer search for pest identification information gets put on the back burner -- which means it is done late at night and often not at all.

Growers do rely heavily on the information in the vegetable production guides that serve states in the Northeast Region. There are three major recommendation guides: the mid-Atlantic *Commercial Vegetable Production Recommendations* (the same content is printed with separate state names for NJ, PA, MD, DE); Cornell Cooperative Extension's *The Integrated Crop and Pest management Guidelines for Vegetables* (NY), and the *New England Vegetable Management Guide* (ME, VT, RI, MA, CT, NH). These publications, which are available in hard copy, ready for use in the truck or the barn, are consistently ranked by farmers as one of their primary sources of information about pest and crop management.

An obvious gap, in looking at the current guides, is that there are plenty of descriptions of pests and how to manage them, but no photos for identification. Since the identifying characteristics of insects, diseases and weeds don't change, it is not necessary to include

photographs in each guide when it is updated. However, there is need for a comprehensive, regional pest identification guide, in print, that growers and agricultural professionals can carry to the field.

In 2004, New England published a *Pest Identification Supplement* to its Guide, with a color photograph of every weed, insect and disease that is mentioned in the *New England Vegetable Management Guide*. This was funded in part by the Environmental Protection Agency, Region I, and published as a collaboration of New England vegetable pest specialists and the New England Vegetable and Berry Growers Association. High quality color photographs are provided in a glossy, sturdy 8 ½ by 11 inch, 26 page booklet. Vegetable growers in New England have been very enthusiastic about this book. The New England growers in our working group note that they keep it handy all the time. The goal of expanding this supplement to include pests listed in all three Guides in the region was strongly endorsed by the Vegetable Working Group as a worthwhile regional project.

In 2005 the Vegetable Working Group decided to expand its scope to include strawberries. Many vegetable growers include strawberries in their crop mix, and most strawberry growers also grow vegetables. Production methods for strawberries are more similar to those of annual cropping systems than long-lived perennial small fruits and tree fruits such as blueberries, cranberries and apples. The mid-Atlantic Recommendation Guide already includes strawberries. Hence, we decided to include strawberry pests in the regional pest ID supplement.

4b. Objectives and Anticipated Impacts.

Objective 1. Publish a *Northeast Vegetable and Strawberry Pest Identification Supplement* that expands the *New England Pest Identification Supplement* to include insects, diseases, weeds and non-pathogenic disorders of vegetables and strawberries for the full Northeast region.

A comprehensive photo ID supplement will result in improved identification of vegetable pests. This improved identification will allow growers to reduce the number of sprays necessary through early detection and a more rapid and more appropriate response. An additional benefit is that growers may be better able to select reduced-risk pesticides and biopesticides, when available. One of the disadvantages of these reduced-risk pesticides is that they have a much narrower target pest population than older pesticides. As a result, proper identification of weed, insect, and disease pests has become more critical. An increase in grower use of these products relative to older, more toxic pesticides will result in reduced risk to the environment, improvements in human health, and reduced pesticide risk.

A further impact will be enhancement of communication among vegetable specialists in the region. In the process of creating this publication we will discuss and review pests that are common to the whole region or unique to one area. Editors and vegetable specialists will become more familiar with each other's recommendation guides. The publication itself will make all users more aware of pest conditions throughout the region. A useful IPM tool that is well-received and widely used will enhance growers' awareness of the Vegetable IPM Working Group and the Northeast IPM Center.

We believe that this project meets all of the desired impact criteria regarding Northeast IPM publications: it address priorities identified by the Vegetable Working Group, fills an important information gap, has wide applicability within the northeastern region, will facilitate and promote interstate collaboration and will be a regional project that would otherwise be undertaken by only the New England region.

4c. Approach and Procedures

Objective 1. **Publish a *Northeast Vegetable and Strawberry Pest Identification Supplement* that expands the *New England Pest Identification Supplement* to include vegetable and strawberry insects, diseases, weeds and non-pathogenic disorders of the full Northeast region**.

We plan to publish a Northeastern pest identification supplement that will include the weeds, insects, and diseases that are dealt with in the three vegetable production guides mentioned above. Strawberries insect and disease pests will be added. Because abiotic or non-pathogenic disorders caused by nutritional or environmental conditions may be confused with pathogenic disorders, we will also expand this section. We will include photos of weeds at the seedling stage (when decisions about post-emergence herbicides need to be made). Disease photographs should include early symptoms and symptoms of the same pathogen on different crops, where those symptoms differ significantly.

The New England supplement has approximately 100 images and we expect to double that number. We estimate that about half the new images needed are already in digital format and the rest will need to be scanned from slides and prints that are in the possession of regional vegetable specialists, especially in the central and southern parts of the Northeast. We will enlist two co-editors for each discipline (weed science, Entomology and Plant Pathology), one each from the northern and southern parts of the region. Kathryn Everts (MD/DE) and Robert Wick (MA) will coordinate plant pathology and non-pathogenic disorders, Rich Bonanno (MA) and Brad Majek (NJ) will cover weed science, and Ruth Hazzard (MA) with an entomologist from the mid-Atlantic region will handle insects. David Handley (ME) will handle strawberry pests. In each case this will involve listing pests from all Guides, finding the best available photograph of those not yet covered, scanning it to high quality digital resolution as needed, and providing short captions. Rich Bonanno of UMass Extension has agreed to serve as general editor, as he did for the New England supplement. The objective will be a completed publication by January 2007.

The UMass Office of Communications and Marketing, which designed and published the New England Pest ID Supplement, has estimated that 6000 copies of a supplement twice as long will cost $17,000 to design and print. Our request in this proposal is for partial funding of the costs of editing and organizing the photographs and contracting the layout and printing. The balance will be covered by additional funding from EPA Region I (for use by New England growers), and sales. States will receive copies at a low, bulk price according to the number of vegetable recommends which they publish; this low price will be passed on to the growers. Additional copies will be available at an affordable retail price. See Budget Justification for details. Promotion and advertising will be coordinated by the editors and the Vegetable IWG.

This publication will also be made available in CD format and on the Internet. The exact web location and host will be determined by the Vegetable Working Group and the editors. The current *New England Pest Identification Supplement* is posted on the website of the *New England Pest Vegetable Management Guide,* http://www.nevegetable.org/.

4d. Evaluation Plans

Objective 1: We will ask state vegetable programs to include question about the ID supplement in their evaluations of their vegetable extension programs. Surveys are already planned in the New England region to evaluate impact of the Management Guide and the Supplement on use of reduced-risk products and practices.