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**Progress Report – Hunterdon County Integrated Pest Management Grant**

Grant Award Number 07-033-07-1000

## **Work Products**

Describe the program(s) to be prepared, as well as project timeframes and target completion dates:

To fund the maintenance, improvement and expansion of the Rutgers Fruit and Vegetable IPM/ICM programs in the northern New Jersey Highlands region. Increase the number of participating growers in the programs, educate farmers about integrated pest management (IPM) and integrated crop management (ICM) practices. Reduce the amounts of pesticides and fertilizers where appropriate on commercial fruit and vegetable farms in the region.

**Progress:** During the 2007 and 2008 seasons the fruit program worked with 24 farms (23 commercial growers in northern counties with 25 individual farm sites. Farms were monitored for insect and disease pests, and recommendations were made to maximize production and reduce pesticide use where possible (Table 1.). The vegetable IPM Program worked directly with 33 growers in the northern counties. On these farms, growers enrolled all or portions of selected vegetable crops for scouting. Crops were monitored for insect and disease pests. Additionally, most farms were blacklight trap sites that contributed data to the statewide vegetable insect pest population map system.

## **Objectives**

- 1) Maintain and expand IPM/ICM programs for fruit and vegetable growers in the North Jersey/Highlands region.
- 2) Expand nutrient management as part of the IPM/ICM programs.
- 3) Expand the programs to include additional growers who have not directly participated in the past.
- 4) Minimize pesticide and fertilizer use where possible, while minimizing potential sources of non-point source pollution.
- 5) Help minimize production costs and optimize profitability for growers, thus helping in the overall sustainability of North Jersey agriculture in the Highlands.

## **Progress on Scope of Work**

- 1) Identification of commercial growers having not participated in the IPM programs in 2006 and increasing program participation; establishing a cost share based on the actual number of IPM participants in the Highlands Region.

IPM information was presented at the North jersey Fruit Meeting, two twilight fruit meetings and 2 vegetable meetings (in 2007. 1 additional in 2008) with a total attendance of 90(for all veg mtgs.) commercial growers from northern counties, of whom 22(veg) were from the Highlands Region. Funding from the Highlands grant remains at approximately 31% of the total vegetable and fruit IPM program costs and 60% of program associate staff and associated costs. Given the percentage on North Jersey IPM participants in the Highlands Region (63 % in 2007), we are meeting our goal of Highlands funds being pro-rated as a percentage of North Jersey IPM participants located in the Highlands.

- 2) Attainment of goals for each program objective and measurable deliverables:

- a) **Number of participants using 2006 as the base year.** During 2007, 23 fruit growers were involved in the North Jersey fruit IPM program, which represents an increase of 2 growers from the previous season. Growers in northern counties were comprised of 16 growers (70% of the total) in the Highlands Region and 7 growers in non-Highlands areas. These numbers remained the same for the 2008 season. A higher percent of the fruit IPM acreage is within the Highlands Region (Table 2). Just over 72% of the fruit IPM participant acreage is within the Highlands Region. The 33 farms in the 2007 Vegetable IPM Program for the northern counties is an increase of two growers over 2006. Of these farms, 19 (58%) were in the Highlands region. Total farms averaged 63% in the Highlands Region.
- b) **Number of site visits made to Highlands growers.** Since the start of the season, 406 field visits were made to Highlands fruit growers, with a total driving distance of 10,193 miles. Highlands Area vegetable IPM participants were visited 555 times with a total mileage of 6,018. As of June 2008, 192 farm visits were made to fruit growers, and 110 farm visits were made to vegetable participants in the Highlands, with personnel traveling over 3,100 miles.
- c) **Number of Highlands growers attending meetings where IPM information was presented.** In 2007, two field twilight meetings were held for fruit growers and 2 meetings were held for vegetable growers. A total of 49 attendees (fruit) and 45 (vegetable) obtained IPM information. Two fruit grower twilight field meetings were again held in 2008 on 3/5/08, and 5/19/08. The May meeting was held in the Highlands with over 40 people attending. One dozen Highlands Area fruit growers attended educational meetings in Hershey, PA during the last of January (3

days) in 2007 and 2008. As of June 2008, one meeting was held for fruit and one for vegetable growers, with 38 attendees for the fruit session and 50 for the vegetable session. The Vegetable Growers Association of New Jersey Annual Meeting in Atlantic City (January 2007) included a sessions on pepper production and cucurbit crop production. IPM information was given at each session, with the pepper session featuring a discussion of methods to enhance biological control of European corn borer. Each session was attended by over 20 Highlands area growers. The North Jersey Fruit Growers Meetings were held in Warren County on 3/9/07, and 3/5/08, with a total audience of 116 growers (56 in 2007, 60 in 2008). Just over half these growers farm in the Highlands region.

- d) **Number of newsletters sent to Highlands IPM growers.** Since the start of the 2007 season, 48 newsletters (fruit and vegetable) were written that contained IPM information. From the beginning of the 2008 season (March 2008) through the end of June, 16 vegetable and 16 fruit newsletters had been published with IPM information. Newsletters are sent by paid subscription by e-mail, fax and regular mail. Throughout the season, 32 Highlands growers received "Plant and Pest Advisory" Newsletters for fruit and vegetable production.
- e) **Number of acres on which IPM practices were utilized.** A comprehensive IPM/ICM program was expanded and delivered to North Jersey growers, the majority of whom are in the Highlands Region. The programs are divided into both fruit and vegetable components. The fruit program consisted of weekly monitoring for insects and disease, monitoring for plant parasitic nematodes, monitoring for plant nutrient levels and fertilizer needs, and demonstration programs for cutting edge, high impact IPM practices like mating disruption for key peach insect pests, and computerized degree day modeling for proper application timing. The program also included soil sampling for plant parasitic nematodes. Much of the soil and plant nutrient work is done in late summer and fall, so as of June that has not been completed for 2008. High nematode populations can kill fruit trees, while soil applied nematicide use should be minimized in order to prevent non-point source pollution. The overall fruit program delivered weekly monitoring information to growers who managed 414 acres of fruit, 300 acres (72%) of which is in the Highlands. IPM information was made available to each participating grower through on-farm scouting reports, field recommendations, and a weekly newsletter, *The Plant and Pest Advisory-Fruit Edition*. Weekly scouting information was also summarized and mailed to other Highlands growers, not in the direct scouting program, thus gaining a direct benefit, although not as tailored, from the scouting program. The Highlands vegetable IPM Program enrolled 517 acres of sweet corn, 168 acres of pumpkins, gourds, and winter squash, 36 acres of tomatoes, 18 acres of peppers, and 29 acres of cole crops in scouting programs. IPM information was provided to growers through on-farm field reports and insect population records, a weekly newsletter (*The Plant and Pest*

Advisory – Vegetable Crops Edition), and the RCE Vegetable IPM website. The latter two sources of information were available to many more growers than those participating in the scouting programs. Expansions in participating and impacted acreage occurred in selected crops. Other services were delivered to growers in addition to crop scouting and insect monitoring via the state-wide blacklight network. These services include (no-charge) heat treatment of tomato, pepper and brassica crop seeds for northern NJ growers in 2007-08. This practice requires specialized water baths operated by IPM personnel and treatments are overseen by the northern NJ IPM project coordinator. Heat treatment helps eliminate bacterial pathogens from seed, thus reducing the impact of those diseases and potentially reducing the need for in-field anti-bacterial agents like copper. The Vegetable IPM Program includes a number of tactics to minimize crop injury while minimizing (when possible) agrichemical inputs. These tactics include " inundative release" biological control for two-spotted spider mites in high tunnel vegetable crops; enhancement and preservation of indigenous biological control organisms for various pests in tomatoes, peppers and brassica crops and production of geospatial maps of key insect pests with associated threshold levels.

- f) **Amount of applications of lb of pesticides used by Highlands IPM growers compared to Rutgers Cooperative Extension State Guidelines.** Highlands fruit growers using mating disruption used about 60% less insecticide than state recommendations for control of Oriental fruit moth in peaches. Use of degree day phenology models reduced insecticide use in peaches by 30 to 40% for Oriental fruit moth, and targeted only 2 sprays for first generation codling moth in apples. Pumpkin and winter squash growers were able to eliminate approximately four fungicide applications (36%) per field in 2007 by participating in the Northern New Jersey Vegetable IPM Program. Northern New Jersey Sweet corn growers were able to eliminate an average of nine total sprays (36%) on sweet corn acreage through participation in the Vegetable IPM Program.
- g) **Use of natural biological controls or taking specific actions to preserve native biological control agents.** Of the 16 Highlands fruit IPM growers, 8 growers had significant activity from predacious mites, and *Stethorus punctum* (the small black ladybeetle mite predator) so that European red mite populations were suppressed, and miticide use was minimized. Aphid predators that were present in Highlands orchards included Syrphid fly larvae, lacewings, lady beetles and other aphid predators. Use of natural biological controls was also used by Highlands fruit growers in 2008 due to the continued use of "soft" pesticides and biologically based pest management practices recommended by Rutgers IPM. Use of these practices enables growers to reduce overall pesticide use, while conserving a more ecological balance on those farms. In the Highlands region, 13 tomato and pepper growers in the IPM program were able to successfully manage aphid populations with indigenous predators and parasites. This

complex of predators and parasites included Syrphid fly and lacewing larvae, ladybird beetles and larvae and Aphidiid wasps. IPM scouting and light trapping activities identified periods when insecticides for other pests were necessary. When this occurred, insecticides with little or no impact on the predator complex were selected after consultation between growers and IPM Program personnel. The high tunnel vegetable IPM program in Northern New Jersey typically includes the release of the predatory mite *Neoseiulus fallacis* for management of the two-spotted spider mite. In 2007, IPM scouting efforts in the Highlands region revealed that two-spotted spider mite populations either did not materialize, or appeared later than normal. This made the expense of predator release unnecessary.

- h) **Growers accessing web-based information.** A summary of the Rutgers Cooperative Extension Web sites for access to fruit and vegetable recommendations, and the vegetable and fruit editions of the Plant and Pest Advisory newsletters is being researched. For the period from July 1 through Sept. 30, the RCE IPM website totaled 85,385 visits. Statistics for the 2008 calendar year are as yet unavailable.
- i) **Blocks or fields where Highlands growers are using soil or leaf tissue testing.** Fertility management was expanded to include a more comprehensive sampling scheme than was previously possible. Leaf tissue samples were taken during July and early August, and soil fertility samples were taken in September. A total of 140 fertility samples were taken, with 100 samples (71%) taken from farms in the Highlands Region in 2007, and an equal number are planned in 2008 which are sampled in August.

#### **Other – Minimizing production costs (from objective 5)**

Grower practices and pesticide use was surveyed for the 2007 season, and will again be surveyed for 2008. Use of traditional more highly toxic organophosphate and carbamates pesticides continues to decline, and be replaced by softer materials and biologically based practices, including mating disruption (peaches), and biological control of orchard mites (apples and peaches).

Minimizing costs has been difficult, since the price for raw materials and agrichemicals has increased over 25% over the last 2 years.

For the 2007 growing season, northern New Jersey sweet corn growers were able to eliminate an average of 9 silk spray applications (36% reduction) by following schedule recommendations derived from the corn earworm (CEW) catches in the RCE Vegetable IPM Program blacklight network. This reduction is in comparison to the standard 3-day schedule that is typically followed in the absence of information on CEW activity. Using lambda-cyhalothrin (Warrior at \$255/gal) as an example, a grower treating 10 acres of silking corn with each spray would save \$50-75 per spray in insecticide alone, or a total of \$450-675 during the course of the season. This does not include the savings related to the cost of diesel fuel needed to make the applications.

Table 1. IPM Fruit growers enrolled in northern counties.

Number of growers	2007	2008	% of Growers in Highlands
North Jersey	23	23	69.57%
Highlands	16	16	

Table 2. IPM fruit acreage enrolled in northern counties.

Rutgers Cooperative Extension Fruit IPM Program 2007, 2008 - Northern Counties			
	2007	2008	% of Acreage in Highlands
Total fruit acreage			
North Jersey	414.29	414.29	72.20%
Highlands	299.1	299.1	