

**Title of project:** Survey of IPM practice adoption in New York State greenhouses

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**Abstract:**

A survey of New York greenhouses was run to evaluate the level of adoption of IPM practices and to compare the results with a baseline survey completed in 2000. Questions covered important crops and pests, cultural practices related to IPM, scouting, disease/weed/insect management, and where respondents receive their IPM information. Three hundred and ninety four surveys were completed; a 44% response rate. Most respondents use at least some pre-season sanitation methods. Analysis of pH and nutrient levels in water, growing media, or foliage is not a common practice. Also, improvement could be made in calibration of sprayers. Scouting is widely accepted as an IPM practice and most growers use some additional elements of IPM in their pest management. Cornell Cooperative Extension is the most common source of information cited. Overall response rates were similar to those in 2000, although the adoption of scouting and use of scouting information has increased by 30 percentage points.

**Justification:**

According to the USDA Floriculture Crops 2006 Summary, New York State had 721 floriculture greenhouse production operations, with over 26,000,000 square feet of greenhouse production space with an estimated wholesale value of \$207 million. In addition there are a large number of retail greenhouses that grow plants on for sale. As reported in a 2000 survey of IPM adoption in New York greenhouses, most greenhouses used at least some basic IPM practices. However, there was great potential for increasing the level of IPM through cultural practices and disease, weed and insect management (Lamboy, 2002).

By running a similar survey in 2007 we hoped to determine if the adoption of IPM practices in NY greenhouses has increased. Information on the level of adoption of specific practices will aid us in focusing educational materials and workshops where both the need and potential impact are the greatest.

**Objectives:**

The survey is intended to provide information on the current use and level of adoption of a wide variety of IPM practices that are appropriate for both retail and wholesale greenhouses. Responses will be compared to those from the 2000 survey to evaluate the effect of IPM training and to help determine priorities for future educational outreach.

**Procedures:**

The 2000 survey was used as a template for the 2007 survey questions. Some questions were modified to clarify the responses (i.e. "Do you routinely test your water for pH, carbonates, etc.?" replaced "Do you keep records of water test results?"). Questions on most common and most difficult to control pests, and on sources of information on IPM were added.

The NY office of NASS reviewed the survey and beta tested it with a focus group of growers. The amended version was sent to 900 growers, approximately 60% of the NASS list of registered greenhouses. Of the 394 responses, 45% were received by mail and 55% were

based on follow-up phone calls made by NASS. Raw data was sent to the IPM Ornamentals team for analysis.

## Results

Responses were collected from 394 greenhouses, a 44% response rate. Peak numbers of responses came from Western New York, the Hudson Valley and Long Island, similar to the distribution of the 2000 survey. Most of the respondent greenhouses were in the small (< 10,000 sq ft) (47%) to medium (>10,000 sq ft, < 1 acre) (40%) size range.

Bedding plants were the most commonly grown crop (85%), followed by vegetable transplants (61%), herbaceous perennials (52%), and flowering potted plants other than poinsettia and chrysanthemum (50%). Less than 50% of the growers reported growing herbs, chrysanthemum, lilies/bulbs, poinsettia, foliage plants, greenhouse vegetables, or cut flowers. The majority of growers (>50%) grew small areas of each crop (1000-5000 sq ft), except those growing poinsettia. Those producing chrysanthemum and poinsettia were most likely to grow a large (> 1 acre) area. The crop pattern was similar in 2000 and 2007, with the exception that there were fewer poinsettias and more greenhouse chrysanthemums grown in 2007.

The most common insect pests were aphids, thrips, fungus gnats and whiteflies (75-43%), which were also considered the most difficult to control. Botrytis and root rots were the most common (43-20%) and most difficult to control diseases (powdery mildew was inadvertently left off the list). All weeds listed were about equal in occurrence, but perennial weeds and algae were considered more difficult to control.

Preseason sanitation practices are commonly followed, with the most common being removing weeds from inside (95%) and outside (81%) the greenhouse, and removing organic debris from floors and benches (87%). The least commonly practiced are using only new pots and flats (49%) and disinfecting the irrigation system (32%). Of those reusing pots and flats, only 56% disinfect them before reuse. Many greenhouses, especially the smaller ones, use hand watering, so there would be no irrigation system to disinfect. However, the positive responses on that question increased 7% from 2000. Also, 7% more respondents (67%) disinfect walls, floors and benches that in 2000.

The majority of respondents do not routinely test their water (60%), monitor salt levels in the potting medium (76%), use foliage or soil analysis to monitor nutrient levels (72%), or routinely calibrate their sprayers (56%). While more respondents in 2000 calibrated their sprayers (57% compared to 44% in 2007), the 2007 respondents calibrated them more often (83% at least once a year vs. 48% in 2000). The majority of respondents do control weeds (98%), inspect plants or cuttings on arrival for diseases and insects (94%), and routinely identify pests before deciding how to treat them (96%). These response rates were all similar in 2000.

Ninety-seven percent of respondents scout for pests, most whenever they are in the greenhouse (52%). In general it was the respondent (77%, usually the owner/manager) who scouted. Few hire an employee (7%) or use a consultant (2%) to scout. While only 33% record scouting results, most use knowledge of pests in previous years (44% always, 31% sometimes) to predict problems and base pest management on scouting results (70% always, 25% sometimes). Both are approximately 30 percentage points higher than in 2000.

Almost all greenhouse growers remove diseased plant material (98%) and most dispose of it appropriately, especially for long term disposal. Most clean their cutting tools at least sometimes (91% up from 70% in 2000). Eighteen percent still apply disease control chemicals on a calendar basis.

Only 59% use sticky cards to monitor for insect population, down from 68% in 2000. However, most (87%) change them at least occasionally during the season. Microbial control products (30%), biological control (15%), or trap/indicator plants (13%) are not commonly used to control insects.

Cornell Cooperative Extension (78%) is the most common source of information, followed by pesticide sales reps (46%). However, only 32% of respondents said they had a current copy of the Cornell Integrated Management of Greenhouse Floral Crops guidelines. Eighty percent of those with employees train them in IPM, with the Cornell Cooperative Extension programs most commonly attended (88%). Most respondents would like to learn more about IPM, with disease/insect ID (80%), general IPM (65%), and biological control (63%) being most requested.

### **Implications**

While IPM for NY greenhouses can certainly still be improved, the effects of IPM education since 2000 are obvious, particularly in scouting and the use of scouting information. There is a definite need to educate growers on cultural practices that affect plant vigor as part of an IPM program. Other tools and educational programs needed include: record keeping for scouting information, sanitation for disease control, and use of sticky cards and other methods of insect monitoring.