Establishing a Successful IPM Program

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In November of 1989, I was hired as greenhouse manager for the Flower Pot Greenhouse. This 5,000 square-foot greenhouse was built as part of a regional mental health facility, located at the State Hospital in Richmond, Indiana. In addition to therapeutic and conservatory uses, it served as a production house for holiday, house and bedding plants. By 1982, increased salary and heating costs almost forced the greenhouse to shut down. Thanks to a private, not-for-profit corporation, the greenhouse was able remain open as a training center for individuals with mental disabilities. Associated Patient Services, Inc. was already managing a sheltered workshop at the hospital when they took over the Flower Pot and—most importantly—since they were privately owned, the greenhouse could now sell plants to the public to offset the costs of production.

The previous manager had a preventative spray program in place. Two insecticides and a miticide were being tank-mixed and applied to everything in the place once a week. Now, please understand that I'm not opposed to using pesticides. It just seemed clear to me that disabled workers and restricted-use pesticides made a poor match. I had heard that Integrated Pest Management was a process which could evolve to meet special needs. Despite my fears of having my crops infested with disease and insects, I decided that I had little choice but to begin a program as soon as I knew how.

For me, IPM was a decision making process for managing pest problems. Pesticides were applied as needed to control insects and diseases observed during regular rounds of pest scouting. By improving timing, scouting could allow more effective use of alternative management techniques, including sanitary practices, leaf removal and application of bio-rational pesticides. Cultural techniques for optimal plant growth could be practiced to keep plants' natural defenses strong. During the process of IPM, good record-keeping would be needed to record successful and unsuccessful practices. My goal was an overall reduction in restricted-use pesticides.

Following the advice that it is best to start small, I began by gathering information and setting some reasonable goals. It wasn't really as complicated as I had expected. I learned how to take soil and tissue samples for analysis at Purdue University. Establishing standards of plant health, however, was difficult for me. I was a new grower, and had a hard time deciding what was normal, what was damage done by a nutritional problem, by pests, or by just poor watering. I read articles and attended meetings on insect life cycles, disease suppression and IPM programs that were in place elsewhere. I bought some sticky traps and a hand lens. I dabbled with insect growth regulators, soaps and oils. Life went on. I kept our preventative spray program during that first year, using IPM on some of our minor crops.

I took the leap during the summer of 1990, when I decided to grow our poinsettia crop using IPM. We started by mowing down the weeds outside the greenhouse and pulling every last one inside. I do mean pull. I was providing training to seven employees so I had to keep them busy. Weeds can be great reservoirs for whiteflies and aphids. Before cuttings arrived, we sanitized all greenhouse surfaces with a commercial disinfectant, and reviewed sanitary procedures with our employees. These included washing hands, keeping hose wands off the floor, and sweeping up puddles. To ensure a clean start, we emptied the greenhouse two weeks prior to arrival of the cuttings. We closed the vents and got the temperature up to 118 degrees for good measure.

When our cuttings arrived, we inspected them for root pathogens and greenhouse and sweet potato whiteflies. Infested plants were discarded, usually fewer than ten per thousand. All this took some time and considerable planning. That's prob-

ably another reason why the word "management" is part of IPM.

Scouting was the backbone of our program. We placed several traps throughout the greenhouse and near the doors, each trap consisting of one blue and one yellow sticky card. I chose one of my best workers and trained him to scout. We made a form that he filled out describing the types and numbers of insects found on the sticky traps and on randomly chosen plants on each scouting date. These records were important in determining when we should spray or if our spray applications were effective.

Over the years our scouting skills improved. The first year, it took the scout two hours to inspect the traps and a dozen or so plants chosen at random, but by the second year he cut his time in half. We learned to tag and track plants with whitefly eggs so that we could determine whether most whitefly in the greenhouse were eggs, nymphs, pupae, or adults. That way, our sprays could be applied on a susceptible stage. The most susceptible stage of both whitefly species is the first and second nymphal stage. If I knew that most of the population was in the egg stage, my scout would monitor them for a few days until they were in the more susceptible stage and apply an insect growth regulator. When adults were a problem, they were best controlled with pyrethrin/rotenone or conventional pesticides.

For our greenhouse to have absolutely no pests was an unrealistic management goal. I selected a threshold level of infestation that would trigger a control. This number of whiteflies I would tolerate changed throughout the season. It was low at first, higher during the middle of production, and low again just before sale. For example, five whiteflies on a sticky trap during August and September would warrant a search for the infested plant which would be sprayed or discarded. I tolerated more during the time when most of the whitefly population was in the egg and pupal stage, usually during October. The exact threshold number during this time varied according to last date of spray application, but normally twenty-five whiteflies on a trap in one week triggered a closer inspection of nearby plants, if not a application of spray in that area. More whitefly adults would also be tolera ted the week after an application of an insect growth regulator, because I learned that this class of pesticide does not kill them. In November and December our threshold level would be very low, five or less per sticky card per week. Our customers wouldn't buy a plant they saw even a single whitefly on.

Another very simple fact was determined from our records early on: many pest populations are localized. This is easy to see when looking at a report where six cards have low numbers of whiteflies and a seventh has over one hundred. I could then ask the scout to inspect each plant near card seven, and he would often find one or two plants infested, which we would simply throw away. No panic, no spraying, and lower costs.

Cultural techniques for insect control included maintaining balanced nutrition for optimal growth, proper spacing for better spray coverage and easier scouting, and sweeping up puddles where fungus gnats could feed or breed. In addition, at the time of pinch the two or three large, thick bottom leaves were removed from the poinsettias to discard the whiteflies that were accumulating on this older foliage.

Our disease control for poinsettia crops was very successful. We adhered to strong sanitation and cultural techniques, especially trying not to over-water. We improved circulation through spacing and horizontal flow fans. Again, small, unhealthy plants were culled. We disinfected all floors, walls, tools and hoses two to three times per month with a commercial disinfectant. In 1990, we spent a little extra money and purchased soil with disease suppressing microorganisms injected into it. We controlled all diseases without a single chemical application that year, but the sunny weather helped us out considerably. In other years, we had limited rhizoctonia and botrytis outbreaks, which we would control by rogueing and fungicide applications.

We were very pleased with our crop's quality and cleanliness in 1990, and succeeded in reducing the number of conventional pesticides used (Fig.1). My headaches increased, I must add, because it took a lot of time and other areas of my job had to be delegated. In 1991, we experienced the best plant quality we had ever achieved, plus an

additional reduction in conventional pesticides over 1990, and improved headache control.

Though the IPM program cost more than the preventative spray program (Fig. 2), my improved quality allowed me to raise prices. The additional twelve cents per plant cost was more than offset by a one dollar increase in retail price. I was proud of our accomplishments and told our customers about it in our newsletter and in person. It was good public relations. I was doing it for their good as much as our own. You're not managing pests if you go out of business doing it, and if my customers were as environmentally-conscious as they said, then I felt they should be willing to pay for my IPM program. They did.

I strongly believe that just starting our IPM program was half the battle. We set a goal to reduce use of conventional pesticides and we achieved it, and at the same time our quality improved significantly. The improvement wasn't necessarily due to the effectiveness of the new chemicals or our cultural techniques, but to the increased role of the manager in the growing process. I was out there looking at the plants more often, becoming more aware of what my crop needed and when. I understood their nutritional needs better and how insect populations and diseases start and are spread. I knew who the good bugs were and who were the enemy. In fact, I was becoming fascinated with the process. Insects and diseases are prolific, fast-adapting organisms that earned my respect as much as my ire. Controlling them with IPM was not as complicated as I thought. If I could do it with little growing experience, no automation and workers who were disabled, I have little doubt of the success that growers with 5 to 50 years of experience could achieve.

This article was written as part of an independent study course with Cliff Sadof, Extension Entomologist, Purdue University, West Lafayette, Indiana.

Figure 1. Comparison of Pesticide Applications to Control Whitefly on Poinsettias.

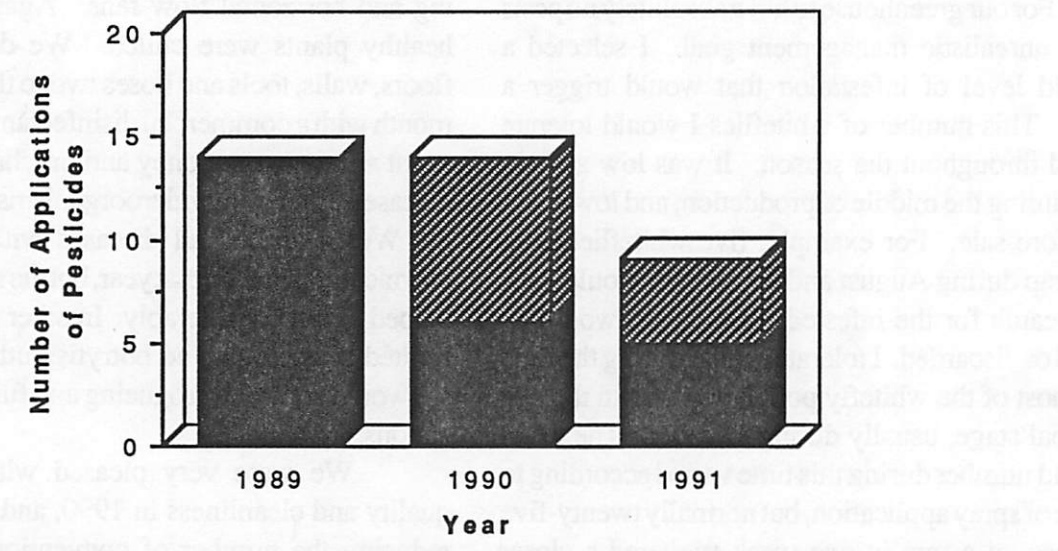

Figure 2. Cost Comparison of Three Years of Whitefly Control on Poinsettias.