Prevent and Exclude Pest Problems

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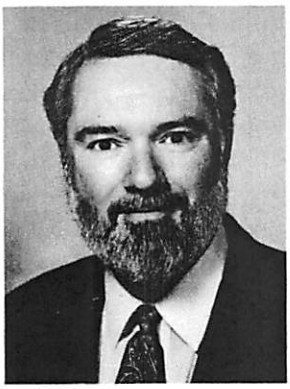

Implementation of new Worker Safety Protection Standards, increases in pesticide costs, and concerns about liability and environmental contamination from pesticides have combined to increase both the cost and complexity of greenhouse pest management programs. These increases should encourage growers to reexamine how they control pests and to look for methods that reduce chemical usage. Two frequently overlooked or under used concepts for pest management that deserve consideration are pest exclusion and greenhouse sanitation. Both concepts, when applied aggressively, are often cost effective, relatively easy to implement, and can have a significant impact by reducing the need to apply chemicals. They operate on the basic philosophy that it is easier to prevent or exclude problems in the first place than to treat them once they occur.

Effective greenhouse sanitation requires a commitment by management to establish a certain "state of mind" or "awareness." This involves establishing in the minds of everyone those areas that should be treated as "clean areas." Employees should be trained from the first day to recognize pest problems, where these problems come from, how they spread, and what employee behaviors are appropriate within clean areas to prevent pest problems. Management should then monitor these areas closely to determine the effectiveness of training. The following is a list of sanitation primers to begin a training program: (1) Wash any tools, containers, or equipment that may be reused on plant material or come in contact with growing medium with a greenhouse disinfectant. (2) Wash your hands before beginning operations that involve contact with plant materials, medium, or containers. (3) Keep hose-ends hung up. Irrigation equipment should be treated as part of the clear area. (4) Bench tops should be considered a clean area. Keep dirty equipment, feet, etc., off the benches. (5) Avoid wearing brightly colored clothing, especially yellow and blue, that may attract insects that hitch a ride into the greenhouse. (6) All weeds should be kept off the floors and pulled from growing containers. Place trash receptacles in each greenhouse and insist that they are used and emptied daily. (7) Infected, diseased, or suspicious plants should be removed with minimal disturbance from the greenhouse in plastic bags or a covered container.(8) Avoid activities that could result in splashing water from plant to plant where possible.

Greenhouse cleanup between crops can serve to prevent carry-over of pest problems to the next crop and eliminate the life-stages of insects or diseases which are difficult to control using pesticides. Though it is best to perform a clean up between each crop, a thorough job can usually be accomplished during the summer, in December between the poinsettia and spring bedding crops, or anytime the greenhouse will be empty for a day or two. Consider the following suggestions: (1) Remove all debris from the benches and floors. Bench tops and solid floors can be swept

or vacuumed to remove plant debris, paper, pots, tags, etc. Vacuuming is especially effective on paved floors because it will pick up weed seed. Bench tops can be treated with greenhouse disinfectants. (2) Remove all weeds from the greenhouse. Use a post-emerge herbicide labeled for greenhouse application on the floors. Most of these can only be used when "desirable vegetation" is not present. (3) Pre-emerge herbicides labeled for application under greenhouse benches can be applied to dirt floors. Gravel or other barrier materials can help impede weed seed germination and growth. (4) Areas with poor drainage that accumulate algae and weeds are havens for insects and diseases and should be repaired. (5) Likewise, repair leaking pipes, solenoid valves, and faucets. (6) Sanitize fertilizer stock tanks and watering devices, such as water wands, water breakers, and drip irrigation tubes. (7) If possible, close the greenhouse for a few days to a week with little or no ventilation. High sunlight and temperature can naturally pasteurize the greenhouse interior. (8) Pay special attention to cleanup in propagation areas. Scrub bench surfaces, piping, and mist nozzles with disinfectant. (9) Clean or replace cool-cells in evaporative cooling systems at the first sign of wear. Dirty cooling pads can harbor insects and diseases. (10) Keep areas around the greenhouse free of debris and consistently mowed. Many growers go so far as to remove all plant material for a distance of ten to twenty feet around the greenhouse and cover this area with gravel or small stone to limit weed seed, insect, and disease entry.

Sanitation should extend beyond the greenhouse to production and storage areas. Avoid storing media and media components outdoors where the bales can get torn or damaged and exposed to sources of insects, disease spores, or animals. Enclosed bens or shelters that will keep media dry are preferable. If outdoor storage is unavoidable, raise the bales off the ground on pallets and cover the stacks of bales tightly with a heavy tarp or plastic. Greenhouse media comes from the supplier reasonable sterile. It does not make sense, therefore, to put that media in used containers. This is

especially true for crops with a history of persistent disease problems such as pansy, vinca, and geranium. Lastly, keep the production area clean and organized. Periodically sweep or vacuum and wash the floor. Hose off and wash potting equipment, benches, belts, machines, etc., with greenhouse disinfectant.

Pest exclusion involves any measure that can be taken to prevent the introducing pests into the greenhouse. It should begin with the arrival of new plant material. All incoming plants or cuttings (rooted or unrooted) should be examined carefully for diseases or insects by an individual trained to locate and identify these problems. Plant material shipments found to be infected should be reported to the supplier and not allowed in the greenhouse or production area. Growers involved in certain types of production or certain crops such as propagation, stock plant production, or cutting geraniums should isolate (quarantine) new material for a period to ascertain if the plants are clean.

Exclusion frequently involves physical barriers to pest entry into the greenhouse. Often, the main problem is to recognize how insects or diseases gain entry. Here are some tips: (1) Make sure greenhouse glazing material is free of holes, tears or leaks that could allow insect or disease entry. (2) Entry-way doors into the greenhouse should seal and automatically close. (3) All dirt floors or dirt floors under benches are difficult to sanitize and can be breeding places for insects and diseases. Make sure drainage is adequate to prevent standing water. Solid concrete floors are much easier to keep clean. (4) Install and maintain exterior louvers over fans that close when the fans are not operating. (5) Exclude pets and rodents from the greenhouse. Animals can bring in insects and diseases on their feet or in their fur. (6) Consider installing screens over vents to prevent the entry of thrips, white flies, etc.

Implementation of judicious exclusion and sanitation practices in the greenhouse can control or help manage many of the pest problems that growers face while reducing the need for chemical pesticides. All things considered, these practices may become more cost effective as the costs of pesticide application increases. However, there is one additional benefit. Most people are more productive and happier in a clean working environment. If presented cleanliness practices with a positive "can do" attitude, many people find additional ways to apply the concepts and encourage others to follow their example.