

## **Tools For Greenhouse Integrated Pest Management: Quarantine and Monitoring.**

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Besides providing an optimum environment for growing plants, greenhouses provide a warm refuge for a number of serious pests, that include: whiteflies, western flower thrips, aphids, spider mites and leaf miners. Each of these pests is capable of attacking a wide range of ornamental and vegetable crops. In the past, pest losses have been reduced largely through the use of pesticides. However, the success of this control tactic has been jeopardized by the development of pesticide resistance and increasing legal restrictions on pesticide use. Resistance has been documented for each of the major greenhouse pests. In addition, some pesticides like aldicarb, that had been central to pest control programs have been legally restricted because of concerns for the public health of workers and consumers. If these trends continue, the greenhouse industry will run out of adequate pest management tools.

Fortunately alternatives are being developed for growers. This article describes two tools, quarantine and monitoring. These are needed for incorporating pesticide alternatives as part of an integrated pest management (IPM) program. IPM can help growers eliminate certain types of pesticide uses that are incompatible with these new alternatives. In the greenhouse, adopting IPM means combining good

cultural practices with a five part system for pest management that includes: quarantine of new plant material, monitoring for pest presence, deciding whether or not to control a pest, selecting a pest control tactic, and evaluating its effectiveness.

### **Quarantine New Plant Material:**

One of the best ways of reducing the need for insecticides is to restrict pest movement into the greenhouse. Aside from preventing the introduction of new pests into the greenhouse, quarantine can also prevent the spread of pesticide resistant strains of pests between greenhouses. When pests such as whitefly or western flower thrips enter a greenhouse they can also bring their pesticide resistance with them.

New plants should be quarantined by isolating all new plant material in a screened off area for a period of about two weeks. These plants should then be inspected to determine if pests are present. This can be accomplished by visual inspection of the plant material upon receipt and before release into the production area. Yellow sticky cards can help detect the introduction of small numbers of pests because they attract adult whiteflies, thrips, aphids, leafminers and fungus gnats. Adults of most of these pests should emerge and be caught in the two weeks quarantine period.

Upon detection of pests, plants should be fumigated and re-inspected for pests before placement in the general production area. When possible pesticides should be used that are compatible with later introduction of natural enemies. Lists of compatible insecticides are available in the first reference listed below.



### Monitoring for Pest Presence in the Production Area:

A proper monitoring system is essential to any IPM program. This involves a regular inspection of plants. Only by keeping records from regular and systematic inspections is it possible to know the status of a pest. Records can indicate if pests are on the rise and can help growers to decide if further controls are needed. Plants should be inspected by both direct examination and by the use of traps. Yellow sticky cards only detect the adults of whiteflies, thrips, aphids, leafminers and fungus gnats.

While traps detect the presence of a pest, they do not determine whether they have established on the greenhouse crop. This requires visually inspecting plants for symptoms, and numbers of insects. While it is impossible to examine every leaf in the greenhouse, some leaves can be inspected. Sampling plans can be devised that can represent pest establishment for a typical crop. This involves examining representative plants from each planting area in the greenhouse. While sampling takes time and money, economic sampling plans can be worked out for individual growers. The sampling scheme needed for a greenhouse will depend on the crop, its value, the cost of control, and the pests likely to present in the greenhouse. Information needed for developing sampling schemes can be obtained from reference 1,2, and 4.

Proper identification of greenhouse pests is critical to any monitoring scheme. Some effort should be made to learn to identify the major pest problems and symptoms. Many of

the more important pests have characteristics that can be identified with the naked eye. For example, spider mites cause a white stippling of leaves and produce webs on leaf undersides. Western flower thrips are often present in plant flowers and cause deformities of the buds. Whitefly, produce a sticky sap and their scale like immatures under the leaves can be readily identified. Color photos that can be used to identify common pests are available in reference 1,3, and 4.

1. Biological Pest Management for Interior Plant Scapes, Steiner, M. Y. and D. P. Elliot, 1987. Send \$2.50 to: Alberta Public Affairs Bureau, Publicity Services, 11510 Kingsway Ave, Edmonton Alberta, Canada T5G 245

2. Integrated Control of Mites and Whiteflies in Greenhouses, Costello, R.A., Elliot, D.P., and N. V Tonks, 1984. Order from: The Publications Office, Ministry of Agriculture and Food, Parliament Buildings, Victoria, British Columbia V8W 2Z7.

3. Scale and whitefly keys #1- 5. by Raymond J. Gill. Send \$10.00 for all five to: State of California, Department of Food and Agriculture, Environmental Monitoring and Pest Management, 1220 N Street, Sacramento, CA 95815.

4. Hussey, N. W. and N. Scopes. 1985 Biological Pest Control, The Glasshouse Experience. Cornell University Press. Ithaca, NY.

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