Crop Culture
- Use pest resistant plant cultivars.
- Provide optimum growing conditions to minimize stress (so that plants can best resist pest attack).
- Avoid overwatering and avoid wetting foliage.
- Heat and vent after sunset to lower humidity (when condensation is a problem).
- Avoid phytotoxicity. Spray when leaves are turgid and early or late on sunny days or on overcast days.

Pest Monitoring
- Use sticky traps to monitor insect populations.
- Inspect crops on a regular schedule. Look for evidence of diseases and insects.
- Correctly identify insects and diseases or seek help in doing so.
- Know damage caused by pests (learn to identify the tell-tale signs).
- Learn insect life cycles, plant preferences and feeding habits.

Spraying (pest control)
- Spot treat when possible.
- Obtain good pesticide coverage.
- Time application frequency to rate of insect development. Insect life-cycles vary with weather conditions and available food.
- Avoid calendar date spraying.
- Use pesticide rotation to avoid build-up of insect resistance.
- Use spreader stickers when appropriate.
- Use lowest effective recommended dose rate to achieve control (do not use suboptimal rates).
- Use least toxic materials when possible (i.e. insecticidal soaps, horticultural oils, Enstar, Bacillus thuringiensis).

Manual Control
- Hand pull weeds.
- Hand pick or vacuum insects when possible.
- Mow grass around outside of greenhouse.

Biological Control
- Introduce biological organisms (i.e. Green lacewing and Aphidoletes aphidimyza for aphids, Cryptolaemus for mealybugs, Encarsia formosa for whitefly, and predatory mites for spider or two spotted mites).
- Encourage build-up of natural pests.

Management
- Establish action thresholds when possible (What level of a pest is tolerable?).
- Obtain proper licensing and stay current.

- Read and heed pesticide labels.
- Record results of scouting and trapping, the control actions taken and the effectiveness of these actions.

As you can see, IPM requires common sense, attention to detail and good record keeping. Are you already using some of these concepts? Probably so. Perhaps some practices are familiar but have worked their way out of your program. Try reintroducing these practices into your program and consider whether a few new concepts can be incorporated into the standard routine.

Pinching Techniques for Poinsettias
Richard J. McAvoy
Assistant Professor and Extension Specialist - Greenhouse Crops.

Poinsettias are pinched to induce branching. Stock plants are pinched, often repeatedly, to increase cutting production. Poinsettias grown for Christmas sale are pinched to produce a full appearance and multiple flowering shoots.

Pinching the poinsettia stimulates branching by removing apical dominance. Apical dominance is a hormone mediated inhibition caused by the growing point on a stem. In the case of the poinsettia, the immature leaves also play an important role in apical dominance. By removing both the growing point and the immature leaves, lateral buds can develop into branches.

There are a number of pinching techniques that a grower can use to stimulate branching including hard pinch, medium pinch, soft pinch and soft pinch in combination with removal of the immature leaves. Depending on the circumstances involved, one technique may be more desirable than another.

The hard pinch involves removal of up to 1" of stem, including at least one fully expanded leaf. The hard pinch is reliable in that it will release apical dominance and allow lateral branches to develop. However, in order to use a hard pinch, plants must be large enough to remove all immature leaves (plus one fully expanded leaf) and still leave a desirable number of lateral buds on the plant. On a late planted Christmas crop, cuttings may not
be sufficiently large to use a hard pinch. Uneven branch development may occasionally occur when a hard pinch is used, resulting in poor canopy shape.

The medium pinch involves removing the growing tip and some but not all of the immature leaves. With a medium pinch, the desired number of lateral buds can be left on the plant (as opposed to the late-hard pinch). However, immature leaves which remain on the plant will inhibit branching. This technique will generally result in an uneven crop, since the degree of apical dominance will vary from plant to plant as either more or less immature leaves remain.

The soft pinch involves removing only the growing point and leaving the young, expanding (immature) leaves on the plant. With this technique more lateral buds remain on the plant but poor break development results. This method is not very desirable for either the stock plant or the Christmas crop.

Removal of immature leaves in combination with the soft pinch is a technique which will induce branching even on small plants. This technique involves removing only the young growing tip plus the leaf blades (but not the petioles or leaf stems) from the immature leaves. With this method, more lateral buds are left to develop on the plant. The leaf removal technique will result in uniform canopy development. However, the technique is tedious (i.e. it takes a lot of labor), and a slight delay (two to three days) in flower development can be expected.

Growers may wish to try the leaf removal technique on late planted (and pinched) poinsettias or on cultivars and under environmental conditions where they have experienced problems with poor break development in the past.

---

Greenhouse IPM
You are Already Using It!

Richard J. McAvoy
Assistant Professor And Extension Specialist - Greenhouse Crops

Are you using integrated pest management (IPM) techniques in your greenhouse? Many growers are and don’t realize it. Often growers associated IPM solely with the use of parasitic insects. IPM is much more. A good integrated pest management program utilizes sanitation, insect and disease exclusion, scouting, record keeping and pesticides as part of a comprehensive pest management strategy.

Read through the following list of practices and concepts that make up a good IPM program. You will notice that many of these techniques are already standard practices used in your operation. Consider which additional practices may be incorporated into the standard operating procedures in your greenhouse. A sound IPM program should help to reduce pesticide usage, increase insect control and crop profitability. Remember not all of these practices will be appropriate for every operation.

**IPM PRACTICES**

*Start clean (and stay clean):*
- Quarantine new plant material before introducing it into the greenhouse.
- Start with clean stock (use culture indexed when appropriate).
- Exclude pests and weed seeds with screening.
- Use mulches or barriers on floors for weed control.
- No smoking with TMV susceptible crops.

*Sanitation*
- Pasteurize potting media and soil benches.
- Sterilize reused pots, tools and bench surfaces.
- Remove old crop residues.
- Remove weeds in and around the greenhouse.
- Rogue and destroy infested plants or plant parts when possible.