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Tis' the season (for plant diseases)

Shorter days and cooler nights are sure signs that winter is just around the corner. Conventional thinking says that a grower's disease problems are all but over for the year, right?

Unfortunately, this isn't always the case, and the onset of less daylight and cooler temperatures can actually contribute to a RISE in plant disease problems. Don't make the mistake of thinking that your plant disease problems will disappear just because the long, hot summer has come to an end. In many ways, considerations about disease control are more important now than ever. Why? With less heat to go around, plants (and the media in which they grow) stay wetter for longer periods of time. Cooler temperatures also necessitate that greenhouses be closed for extended periods of time, which can lead to problems including less than sufficient airflow and stagnant air. Additionally, the air that is being pulled into the greenhouse by fans from outside is also cooler. Add it all up, and you have cooler, wetter conditions that are right for invasion by, and establishment of, pathogenic fungi.

"Root rots can be a problem in the winter," says Margery Daughtrey, Plant Pathologist at Cornell University. "Although some species of *Pythium* such as *Pythium aphanidermatum* are a big problem in summer heat, other species such as *Pythium ultimum* and *Pythium irregulare* are favored by the temperature conditions that prevail in greenhouses in the winter."

Another factor to consider is that cooler temperatures often equal less water evaporation. According to Daughtrey, "the winter months provide an environment ideal for powdery mildew on poinsettias (which does not prosper as long as the daytime temperatures are reaching 89°F). The daily shift from bright sunny days to cool nights can set the greenhouse up for condensation on plant surfaces, which is an invitation to *Botrytis* blight."

As if the things mentioned above aren't enough to think about, there are also a number of "people factors" that must be considered when the weather begins to change. At this time of the year, there are far more opportunities for human error that can increase the incidence of disease. Such mistakes include not heating or watering properly, improper ventilation, and forgetting to turn on fans for proper air circulation. Unfortunately, such errors can be catalysts for some pretty serious disease problems.

"Disease pressure is higher in the winter for certain diseases, many of which can be prevented through good cultural practices," said Nancy Rechcigl, Horticulturalist at Yoder Brothers (Parrish, FL). "Industry-wide, the most prevalent diseases during this time are Downy mildew, *Botrytis*, and *Pythium*."

Other diseases seen during the cooler months include *Phytophthora*, *Pythium*, *Alternaria*, and *Fusarium*. There are those who might attribute such occurrences to the fact that "accidents happen." But in the business of growing, even the smallest mistakes can have some pretty big consequences.

Sound management practices and a firm grasp on the effects that changing conditions will have on your plants are key. "Most of disease prevention has to do with three things: management techniques, attention to detail, and observation skills," says David Plant, a plant specialist with IAS Laboratories in Phoenix, Arizona. "Observation skills are really critical. After all, it is pretty difficult to treat something if you can't recall exactly what you observed. You should always be looking at things with a keen eye." And what exactly are some of the things for which growers should be looking?

"When you get shorter, more humid conditions, *Botrytis* is the first thing to rear its ugly head," comments Lloyd Traven of Peace Tree Farm in Kintnersville, Pennsylvania. "Mildew is less of a problem, but it can also happen. You'll also see root rot diseases until you make the leap into saying, 'it's not summer anymore.' That's the time when you need to cut back on your fertilizer and water usage, look at ammonia to nitrate levels, and so on. Whole nitrification ratios change at this time of year. During cold, dank, wetter conditions, you'll get real soft, ragged growth that is very susceptible to disease."

"There are definitely some things you can do culturally to help minimize disease problems," says Yoder Brothers' Rechcigl.



POINSETTIAS AT PEACE TREE FARM, KINTERSVILLE, PA.

PHOTO COURTESY OF KEVIN HATTORI

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“For instance, making sure that plants do not go into the evening hours wet will help minimize Downy mildew. Practices like watering early and keeping nighttime temperatures above 75 degrees Fahrenheit are an absolute must.

“Of course, we use fungicides on crops that are prone to disease, but prevention really does go a long way.”

Traven notes that fertilization should be cut back, and that an almost 100 percent nitrate form should be utilized during the cooler months. Once this switch is made, it is extremely important to monitor pH levels, since maintaining proper pH is critical to controlling disease.

“Whereas fungicides are concerned, we use Companion biological fungicide,” offers Traven. “All of our plants are ‘hit’ with Companion at their initial watering. That way, we have beneficial microbes already in the media. We have not felt the need to use a fungicidal drench on our poinsettias for years. We are also going to begin using a soil mix that has Rootshield incorporated into it, and are confident that the combination of two beneficial microbes will be a successful one.”

Like Traven, Plant also believes in using biologicals to battle disease. “Obviously, healthier plants are better able to resist disease,” he says. “Chemical fungicides actually impede rooting, so we try to avoid them at every cost. We apply biologicals once per week. Establishing beneficial bacteria in the media provides us with disease reduction while improving plant ‘take’ and rooting.”

Biological fungicides can be quite effective against root rot diseases commonly seen in the cooler months. By putting active, beneficial microbes (in this case, *Bacillus subtilis* GB03 bacteria) into the growing media, the possibility for human error is reduced. The *Bacillus subtilis* GB03 colonize the roots of the plant, where they minimize the risk from errors by keeping pathogens from taking hold. These bacteria out-compete disease pathogens, preventing them from even reaching the plants’ roots. They also produce a broad-spectrum antibiotic (Iturin) that causes pinholes in the cell walls of the pathogens. The weakened pathogenic fungi are far more susceptible to death and the effects of chemical fungicides (even at reduced rates).

And since old and dying roots are a food source for the *Bacillus subtilis* GB03, these microbes actually function as “root cleaners.” Clean root systems offer far fewer opportunities for diseases pathogens to become established, and plants with healthier rooting are better able to take up and utilize nutrients. **GB**



NEW ROOT GROWTH OCCURRED 12 DAYS AFTER APPLICATION OF COMPANION BIOFUNGICIDE.

LOCAL GROWER IN HAMILTON, NEW ZEALAND. / PHOTO COURTESY OF KEITH GIERTYCH, GROWTH PRODUCTS, LTD.

—Kevin Hattori is director of public relations for Growth Products, Ltd.

Disease control starts with detection

Problem identification

Monitoring (also referred to as scouting) is the basis of any IPM program.

Monitoring is the regular, systematic inspection of the crops, benches, greenhouse floors, and exteriors to identify and assess insect, disease, weed and cultural problems.

It includes inspection of foliage, flowers, and root systems, determination of soil pH and conductivity, and the use of insect traps.

Other monitoring tools include indicator plants, disease detection kits, and the submission of plant or soil samples to diagnostic labs for analysis.

Furthermore, monitoring includes an overall inspection of the greenhouse for production practices and greenhouse conditions that contribute to pest problems, such as watering nozzles left on floors or areas of

standing water, or poor air movement.

This information is then used to decide whether action is needed and which tactics to use.

Accurate information gathered through scouting is the basis for sound pest management decisions.

The ability to accurately identify plant problems is critical to the success of an IPM program.

Management strategies

After each scouting session, record and summarize your observations.

This information includes insect identification and counts, disease incidence and severity, and location of weeds. Also make notes about cultural aspects of the crop (such as crop height and plant development) and management of soil fertility and water. **GB**

—New York IPM Department