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Managing **Pests & Diseases**

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MANAGING INSECT PESTS
AND DISEASES IS A
MAJOR CHALLENGE FOR
NURSERY PROFESSIONALS
NATIONWIDE, AND MISTAKES
COULD PROVE COSTLY TO A
SUCCESSFUL OPERATION.

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As most professionals know, there is absolutely no substitute for quality. Offering a satisfactory product or service is the central focus of any company — and it can make or break a successful nursery business. However, quality does not only involve the labor to produce balanced upper plant canopies and large root systems, it should also involve a commitment to preventing and controlling insect pests and diseases.

Each year, every grower must face the threat of insects and diseases. Quality stock can be destroyed within a few days if a grower is careless. Prevention is by far the easiest and most cost-effective control option available — and anyone can do it if they really want to.

From my years of observations, it is clear nursery professionals who are the most vigilant about prevention are the ones with businesses that suffer the least from insect and disease damage one year to the next. They are also growers who tend not to pass along insect and disease problems to their customers. It often takes many years for a nursery operation to build a dependable reputation for having quality plants. By shipping out insect and disease problems to customers, that company can easily destroy its hard-earned reputation.

CAUSE AND APPROACH. Based upon customer demand, growers maintain numerous plant varieties at specific sizes. They work hard to develop material that has abundant, healthy root systems and to guarantee the species will survive in a variety of soil conditions. Dependable quality is not a matter of luck, but the product of education, relentless hard work and a strong commitment to excellence.

No matter how much attention a grower gives to producing healthy, attractive plants, insect and disease problems will be present. There is nothing more frustrating to a grower than watching insects or disease destroy a marketable crop. But it is also true that there is nothing more frustrating to a customer than purchasing plants and discovering later that they are infested by insects or disease. Not only does the customer run the risk of introducing the problem into the premise landscape, but now the burden of control is his. If a nursery business is going to remain successful, insect pests and diseases must be properly controlled. One of the best ways to approach an infestation is not to let excuses interfere with what is actually happening. A staff member needs to be out in the field monitoring the inventory on a regular basis. It is easy to blame the weather or a neighboring property for your insect and disease dilemmas, but many times other reasons may exist.

Wet weather significantly increases the incidence of disease, but so do overhead irrigation, packing plants into areas of limited air circulation and unsanitary conditions. Such problems may include anthracnose on numerous varieties of deciduous trees and shrubs, septoria leaf spot on dogwood (*Cornus* spp.), cotoneaster leaf spot on

cotoneaster (*Cotoneaster* spp.), phomopsis tip blight on juniper (*Juniperus* spp.), dothistroma needle blight on Austrian pine (*Pinus nigra*), tip blight (*Sphaeropsis sapinea*, formerly diplodia) on Austrian pine, *Rhizosphaera* needle cast (*Rhizosphaera kalkhoffii*) on Colorado blue spruce (*Picea pungens*) and Swiss needlecast on Douglas fir (*Pseudotsuga douglasii*).

In addition, growers need to know if their field problems are the result of an influx coming from neighboring properties, if they are being introduced on newly planted liners or coming from the landscape holding yard. All these factors play a major role in how remedial actions might be addressed.

DETECTION. Before enforcing proper measures, however, it is important the troubling insect or disease be identified correctly. Are you sure of your diagnosis, or are you going by hearsay? Are you identifying the pests or plant symptoms by comparing them to pictures in reference books? Although these procedures might follow a logical beginning, they can easily lead to misdiagnosis. It is usually best to have an experienced professional view the problem. If uncertainty still exists, samples should be sent to a university diagnostic laboratory.

The earlier an insect or disease problem is detected, the easier it is to control. Nurseries affected the worst by such outbreaks are the ones that put very little effort into prevention. They typically wait until the problem is seen first, and by the time it is noticed, the best opportunity for treatment has already passed.

One of the best ways to prevent pest infestation is to know where your plants are coming from. Who is your supplier, and how are their plants grown? Who are the suppliers of your supplier? What are the insect and disease problems common to their growing fields?

As a rule of thumb, growers who put care into growing their nursery stock usually have advanced insect and disease prevention programs. Growers who slam root systems into little holes, leave plants in the field for 10 years in waist-high weeds, then harvest them on a clearance sale usually have no idea what insect or disease problems are in their material.

But due to human nature, clearance sales are tempting. I have seen quality growers bring in these sort of plants and set them into their holding yard next to millions of dollars of field inventory. Sometime, soon afterward, strange insects may be found crawling on the stems of their high-quality plants. Panic



***Sphaeropsis* tip blight affects the branch tips of an Austrian pine.**

usually sets in quickly, and a short while later the sprayers can be heard humming in the field.

Another means of prevention is to know what insect or disease problems exist in neighboring woodlands or surrounding properties. For example, if tip blight and Zimmerman pine moth (*Dioryctria zimmermani*) are major issues with pines on properties surrounding your growing fields, planting Austrian pine in your field inventory is only asking for trouble. To avoid constantly having to apply treatments, it might be well-advised not to grow a plant that is so highly susceptible.

If customer demand must be fulfilled, it would be very cost-effective to buy the susceptible plants from a supplier who doesn't face your same risks. But still the ethical question may arise, "Why sell a susceptible plant into an area that will ultimately become affected by an endemic insect or disease problem?" However, it is also true that there are few plants — virtually none, in fact — that can be planted into the land-



Japanese yew shows signs of Fletcher scale.

scape without being subject to some serious insect or disease problem.

This brings up another important preventive option — resistant cultivars. There are certain crabapple (*Malus* spp.) varieties, for example, that are devastated year after year from apple scab. But there are also resistant cultivars that can grow right next to them and be seemingly unaffected. Using resistant selections should always be at the forefront in the inventory planning process.

Beware, however: “Resistant” does not imply “immune.” A resistant plant can still be affected by the insect or disease problem it is typically resistant to, but usually with a much lesser degree of damage. One example of this would be apple scab (*Venturia inaequalis*) on crabapples.

Birch (*Betula*) varieties, resistant to bronze birch borer under favorable conditions, can be infested and destroyed by borer attack. I don’t know how many times I have stood in a field after tagging rows of trees for the presence of borer while the grower standing beside me says, “These trees are supposed to be resistant.”

CONTROL. No control program is perfect. No one has all — or even most — of the answers. Each year, each month and each day is a learning experience. I try not to let what I know get in the way of what I see.

Growers often find themselves in quite a dilemma when it comes to many insect- and disease-control issues. On one side, we have environmentalists who do not want nursery professionals to treat at all. On the other side, we have paying customers who do not want any insect or disease problems.

Your local university extension specialist may tell you that the insect or disease problem is only aesthetic and not to worry about controlling it. So the shipment goes out. Now the customer’s lawyer is on the telephone with your lawyer, discussing financial liability. How can this be prevented?

Be up front with the customer from the start. You might tell them, “Yes, we have the size plants you want, but in the region they are grown, XYZ disease occurs. It is not considered a problem in our state, but is it considered a problem

in yours?” This might sound kind of corny, but if more growers followed this advice, there would be fewer lawsuits. Nobody wants to pay to receive someone else’s problem, even if the problem is only considered cosmetic.

Knowing what insect or disease problems are present in your fields, no matter how cosmetic, might help determine what marketing limitations you have. It is more cost-effective not to ship a problem than it is to have the shipment held up because of the problem. And if it is decided that the market in the other region is desirable, then controlling the cosmetic problem should be considered.

Many insect pests and diseases that affect nursery stock can be controlled if the grower honestly decides to make that an objective. Some of these include Fletcher scale (*Lecanium fletcheri*) on Japanese yews (*Taxus* spp.) and arborvitae (*Thuja* spp.), pine needle scale (*Chionaspis pinifoliae*) on various pine (*Pinus* spp.) and spruce (*Picea* spp.), cedar quince rust (*Gymnosporangium clavipes*) on cockspur hawthorn (*Crataegus crus galli*) and Washington hawthorn (*C. phaenopyrum*), Rhizosphaera needle cast on Colorado blue spruce, Dothistroma needle blight (*Dothistroma pini*) on Austrian pine and Swiss needle cast (*Phaeocryptopus goumanni*) on Douglas fir.

The objective is to provide this control with a minimum number of treatments, yet not compromise the quality of plant inventory. It is no secret that timing is everything. Your nursery stock is valuable. You cannot afford to be guessing with control programs, which might be costing you more money than you think. Not only must one take into account the actual plant losses from insect or disease damage, but the cost of each treatment as well. However, the

Observations from the field

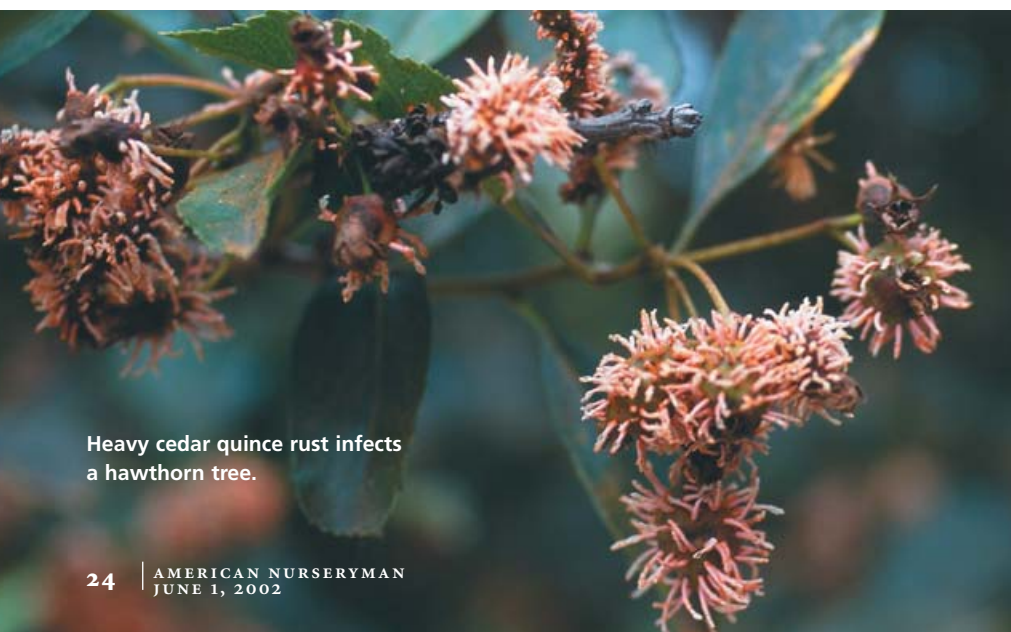
In 1989, a close friend and mentor, Don Orton, published the book *Coincide* — *The Orton System of Pest Management*, co-written by Dr. Thomas L. Green. For a number of years, I aided Orton by making observations to include as data for his book. Not only would I religiously calculate the degree accumulation values year after year, I would also closely observe the pest insect populations common to my local area (Hardiness Zone 4: 3¹/₂ years in Charles City, IA; Hardiness Zone 5: 3¹/₂ years in Cedar Rapids, IA).

It was Orton’s hope to identify the periods of insect pest vulnerability by coordinating them with the growth development stages of certain plant indicators. Examples of a few indicator plants observed included *Acer saccharinum* (silver maple), *Catalpa speciosa* (Northern catalpa), *Cornus mas* (Cornealian cherry dogwood), *Hydrangea arborescens* ‘Grandiflora’ (Hills of Snow hydrangea), *H. paniculata* ‘Grandiflora’ (panicle hydrangea), *Magnolia* × *soulangiana* (saucer magnolia), *Spiraea* × *vanhouttei* (bridal-wreath), *Syringa reticulata* (Japanese tree lilac) and *S. vulgaris* (common lilac).

Insect plant pests in southeast Iowa tend to be about one week ahead of the same plant pests found in east central Iowa. Plant pests in southwest Iowa tend to be almost two weeks ahead in development than those located in east central Iowa. East central Iowa tends to be about one to two weeks ahead in development of northern Iowa. And east central Iowa seems to be about one week to 10 days ahead of Lake County, IL (just north of Chicago).

If you were to try to follow a treatment timing based on a calendar date, such as mid-May or mid-June, there is a good chance the treatment will not be effective.

To this date, including Orton’s field data and the data I collected, we have accumulated more than 30 years of field observations from nurseries. There is no doubt that temperature does play a major role in the development of insect pest life stages and the blooming stages of plants. By viewing the developmental stages of certain indicator plants, plant pests can have the vulnerable periods of their life cycles identified. By using these coordinated timings, control treatments are much more successful with fewer chemicals needed. Logic would also suggest that by using fewer chemicals, more of the parasite and predator populations would be preserved and control program costs would be significantly reduced.



Heavy cedar quince rust infects a hawthorn tree.



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real loss is when a problem is treated at the wrong time.

For example, insecticide treatments must be applied when the insect pest is present in enough numbers and in a vulnerable life stage to make that treatment successful. If the treatment does not work, the plants not only suffer damage, but the insects remain in enough numbers to make the damage even worse. This usually results in additional ineffective treatments, not to mention unnecessary loss of many of the natural parasite and predator species that may have been present.

Timing is also essential when considering control of many disease organisms. For many fungi, it is important to know the period of sporulation and when host plant tissues are susceptible to spore germination. In that way treatments may be directed at ideal timings to protect the plant's foliar and stem tissues. However, a major reason fungicidal treatments fail is the nursery's method of watering. No matter what your control timings, if you are watering from an overhead-type system, it is difficult to control any disease.

Also, in most cases, the vast majority of water never reaches target plants, especially in container and stock holding yards. Control results are far better when nurseries use a drip style of irrigation. This not only dramatically conserves on the amount of water needed, but it maintains the host plant's upper foliage and stems in a much drier condition, which is far less conducive to the spreading of many fungi.

The insect and disease organisms present in your nursery could not care less what you, I or anyone else thinks. They are just out there waiting for us to give them the opportunity to survive. Many times people do an excellent job of helping these opportunists continue their life cycles, though it is not intentional.

Learning how to prevent insect and disease establishment can be a major cost-saver. Selecting resistant varieties can also be very helpful. However, when you do have to treat for an insect or disease problem, treating at the correct time will not only yield significant results, but may reduce the number of treatments needed to control the problem.

The stock shipped from your nursery is a statement of your commitment to quality. Once the truck leaves your premise, it is quality that the customer expects, not excuses.

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