



# HORTICULTURE NEWS

Fall 2004

## Wet Growing Season of 2004

**Wet Soils:** Excessive water in the root zone has caused decline in some trees and shrubs. This problem can be due to poor drainage in the planting hole. The “bucket effect” involves planting in a heavy soil, water flows to the planting hole and the porous media the new transplant is growing in. When the roots are saturated long enough they decline and die. Trees and shrubs that were planted too deeply are suffering because the excess soil moisture is drowning the roots.

**Stressed Plants:** pH is a problem and I think this has been a bad year due to wet soils. I am speculating that the root systems and maybe even mycorrhiza of these trees were impaired due to saturated soils that occurred repeatedly this growing season.

**Diseases:** The excessively wet weather has favored fungal diseases of plants in the landscape. Apple scab, for example has nearly defoliated susceptible crabapple trees. Problems related to transplanting have also been an issue this year. Other fungal diseases prevalent this year include black spot of rose and tar spot.

**Mushrooms etc.:** The fungi that decay wood and other organic matter are also favored by these wet conditions. Mushrooms in the lawn

and landscape have been common. Expect to see even more this fall.

**Shotgun fungus:** Are you noticing tiny little specks on the siding of structures or on cars parked near mulched areas? A fungus called *Sphaerobolus stellatus*, which is also known as the shotgun fungus, may cause the specks. Its common name is appropriate since this fungus forcibly “fires” its spores into the air. Wherever they land, they stick with incredible tenacity-the spots resemble fly specks and defy almost every effort to remove them.

This fungus thrives in moist decaying wood and produces its spores in the spring and fall. It does not harm landscape ornamentals but causes aesthetic problems when it ejects its spores onto walls, cars or other objects.

Since this fungus feeds on decaying wood and not bark, using a bark mulch near visible surfaces should help. Also applying a fresh layer of bark mulch over the top of the infested wood mulch may help block the spore masses from reaching vulnerable surfaces.

**Sour Mulch:** Wet mulch piles, which lack aeration, can lead to sour mulch. A strong off-odor is the first clue that there may be a problem. If used in this condition plant damage can occur. The damage from sour mulch resembles that caused by drought, poor drainage, fertilizer burn, or herbicide misapplication. Symptoms induced yellowing of leaf edges, scorched-looking leaves, defoliation, and/or death of plants. The toxins

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in sour mulch dissipate rapidly. If your smell test leads you to suspect a problem, spread the mulch out in a shallow layer for a few days on a driveway, tarp, or other place where it won't damage plants. Exposure to air will get rid of the gaseous toxins.

**Slime molds:** These molds have also been active this summer. These fungi feed on organic matter and live in wet, humid conditions. They start out a bright yellowish color and then when conditions are right they will stop moving and produce a mass of dark colored spores under a light tan colored crust. Physically removing the fungus is the best approach to control.

### Plant Selection and Compost Improves Profits On Tough Sites

The wholesale price of plants at the nursery is just the beginning of a contractor's cost of successful plantings. Unfavorable site conditions can kill those handsome plants we have just bought. For many of us who plant ornamental trees and shrubs in suburban and urban settings, costs are best controlled when we accurately assess and control site conditions. With high costs of labor, fuel and insurance, we certainly need higher survival plant rates to ensure profit these days!

Though basic rules such as 1) starting with healthy trees that are well suited to site conditions, 2) planting at the correct depth and 3) regular, deep watering during the first season still apply, the role of well-structured soil is most often overlooked. We should not think that by adding just a few shovels full of peat moss to a large volume of backfill, we are providing all the necessary amendments and food for healthy plant development. Judging by the high mortality among trees on many local commercial projects, this is really a fairy tale.

Current research shows that many urban planting sites have severely compacted, and poorly drained soils. It is fact that in some residential developments, good topsoil has

either been sold by the developer or covered with impenetrable subsoil during construction. In either case, trees and shrubs require amended soil conditions for successful growth.

According to Dr. Nina Bassuk's research at Cornell University, root zone restriction in tree plantings is a leading cause of plant losses. Other leading causes of plant loss in clued: lack of winter hardiness, salt application on nearby paved surfaces, loss of feeder roots in transplanting, and unsuitable pH. Of course plants may also be killed by excessive wind, ice damage or vandalism.

Dr. Bassuk's research has shown that using generous amounts of compost in the backfill mix can substantially improve transplant survival. Her studies show that trees may benefit from much higher amounts of compost than we historically specified for backfill mixes. Compost additions of 25 to 50% of soil volume are now recommended for many species. The amended soil allows new roots to penetrate further into the soil, thus enabling the tree or shrub to compete more successfully for water and nutrients.

Compost also helps produce better tree growth in dry sandy soils, by increasing the moisture holding capacity. Long-term benefits in either clay or sand will include greater drought resistance, better winter survival and less susceptibility to insects and diseases. Eliminating these problems means that we will install a plant that pays for itself with dividends of lowered maintenance and greater customer satisfaction.

You can obtain lists of newly recommended trees and have soil evaluated though Cornell Cooperative Extension. By Bob Eller, CCE Wayne County

### Smart Marketing "Sell Value-Not Price"

Given the current "market winners" in the selling world, one would think that price is the primary reason people buy a product or service.

Some evidence of this would be the phenomenal growth of such chains as Wal-Mart, Home Depot, Dollar Store, etc. To be able to sell at the lowest price, these chains are continually pushing, if not demanding, that their suppliers give them lower prices as well. Under this situation, one might conclude that selling at the lowest price is required to be successful in today's market.

I would argue that unless you are without a doubt the lowest cost provider or producer, you cannot and should not sell merely based on price. This then raises the question of how can one expect to survive in today's environment if an increasing number of potential market outlets for our products and services are squeezing to get the lowest price possible? The premise of my argument is that all organizations and **people will buy**, and continue to buy, **if they believe that value has been received** as a result of the transaction. What this means is that in addition to price, there are other benefits, both tangible and intangible, which must be present in order for a buyer, whether a corporation or an individual, to feel they have received value. The purchase must contain an appropriate level of total benefits to satisfy the needs that drove the purchase in the first place.

Selling based on price alone is a flawed concept. There is evidence throughout the country that demonstrates this concept. Brands such as Rolls Royce, Jaguar, Lincoln, Ford, and Hyundai all demonstrate the ability to satisfy a broad range of value propositions in the transportation industry. More relevant might be an example from the food industry's coffee category. Folgers, Maxwell House and Hills Brothers are working hard to maintain their sales, yet companies like Starbucks and Green Mountain Coffee are growing their sales leaps and bounds. The value being sold and delivered by Starbucks and Green Mountain Coffee, in addition to a quality coffee, is pampering in a complex and difficult world, cult membership, mental links to a scenic location (Vermont), and images of vacation and relaxing fun times. While the other national brands have a price advantage, their value is not equivalent to that of the newer premium brands in the eyes of the consumer.

While this might be a simplified example, the bigger question remains: How can I compete in today's environment? Simply stated, it means that one must look carefully at their product and service. Marketers need to assess the competitive climate in the region, country and world to determine how it might affect the value of what they have to offer, learn to identify what the purchaser needs to see or experience that supports their sense of value while satisfying the needs that drove the purchase initially, and, finally apply what is learned when making a decision as to where products or services are to be sold, who (in the case of large organizations or commodity products) to sell to, and at what price.

The key to success is that price and value must be a conscious decision on the part of the company. **Wherever the price and value position for your product or service is in the market right now, it can be changed.** An example of a large company working to move its products up the price and value scale is Subaru. They are actively and carefully working to change the value proposition of the brand. The Subaru Company has accepted that they will most likely alienate some of their existing customers, in fact losing them to competitors, but still believes the changes in value proposition and price is where they want the company to be to maximize its sales and viability.

Is this concept easy to state on paper? Most certainly yes. Is this concept easy to implement? Most certainly no. It takes time and practice to develop an accurate picture of the value proposition. It is, however, a concept that can be worked on and applied over time slowly improve the selling price and business position. While the examples I have cited are not specifically from the food or agriculture sectors, they can be learned from. Sales, buyers, and customers share common attitudes across all aspects of business sectors. Looking to other industries to learn from their success and mistakes can shorten the learning curve and help us to improve our business practices in a shorter time period.

By: Bob Weybright, Extension Support Specialist New York Agricultural Innovation Center, Cornell University

## A Simple Strategy That Helps Reduce Thrips and Virus Problems

In the spring of the year, western flower thrips escape from greenhouses and begin to reproduce rapidly on ground cover around houses. Some of the escaping thrips will carry several of the viruses they transmit to most of the crops being grown across Canada. Consequently, the viruses will become established in many of the native and ornamental plants growing on the property, and each new generation of thrips on those plants will acquire these viruses. As the outdoor thrips population increases, so does the number of thrips being carried back into houses through ventilation openings. The numbers can be extremely high during the summer months.

One strategy to limit the re-entry of thrips, as well as escapes, is the use of screening around ventilation openings; this was the topic of an earlier article and the practice is gaining approval among growers. Moreover, the effectiveness of this strategy can be improved if growers establish a boundary around their greenhouses using an easily manageable groundcover, such as certain grasses, on which thrips may not reproduce well, and in which the viruses do not become established.

Tests on the reproductive potential of thrips on grasses were conducted with a selection of ryegrasses and fescues provided by OSECO Inc., of Brampton, ON. The results in the graph show that the numbers of larvae on all of the selections were low, indicating that these grasses, in particular, will not support high levels of reproduction. Numbers of larvae on broad-leaf plants growing near these selections were considerably higher.

Of the selections tested, the chewing fescue, the creeping fescues, and the hard fescue, had the lowest levels of reproduction and any would be a good choice for a groundcover. However, a mixture of the three types should increase chances of establishing a groundcover when

diverse growing conditions exist. These grasses are not known to be susceptible to the tomato spotted wilt or the impatiens necrotic spot viruses transmitted by the thrips. In situations where a live groundcover is not wanted, a cover of black plastic or horticultural cloth which in turn is covered with gravel will deter the establishment of weeds.

For more information on the grasses tested (e.g. names and lot #'s), call Dr. Wayne Allen at 905-562-4113. This research was funded, in part, through the CanAdapt-Mil program, and plant material for rearing thrips was provided by Yoder Canada, Leamington, ON. Source: Dr. Wayne R. Allen, Agriculture & Agri-Food Canada SCPFRC, Vineland Station, Ontario, Canada

## Sources of Plant Disease

*Where do diseases begin?* The greenhouse manager who can answer this question is in an excellent position to prevent losses due to plant pathogens by reducing or eliminating the numbers of pathogens at their source. The major sources of living things that commonly plague greenhouse crops are noted here. After reviewing this article, make an inventory of the practices you employ in your operation and note which make your crops vulnerable to a disease problem and which help avoid diseases.

### Infested Soil

Many plant pathogens can be found in soil. Fungi such as *Pythium*, *Phytophthora*, *Fusarium*, *Rhizoctonia*, and *Thielaviopsis*, crown gall bacteria (*Agrobacterium*) and most nematodes reside in the soil. *Pythium* species are found in sand and peat as well. When greenhouse crops are potted in a mix containing these pathogens, the pathogens are stimulated into activity by nutrients that leak from the plants' roots and disease may begin. Therefore, the potting mix must be free of pathogens before planting. A potting mix that has been treated to kill plant pathogens or a soilless mix purchased with the assurance of being free of pathogens should be handled as if it were food and kept

free of unwanted organisms. It should be stored on a clean surface, moved with clean implements to a clean potting bench, and placed in clean pots or flats.

No matter how careful a grower is, disease caused by soil borne pathogens still can occur. Besides the potting mix, soil is found many other places in the greenhouse. Soil is usually under benches, in aisles, and in the benches in older greenhouses. Soil is brought into the greenhouse on workers' and pets' feet, on machinery used to move materials into the greenhouse, and on crates, flats, and boxes stored outdoors unprotected on the ground. Care must be taken to avoid getting this soil that may be contaminated into the potting mix. Tools, hose ends and other things that have the potential of moving pathogen-containing soil into a pathogen-free potting mix must be thoroughly cleaned and disinfested. If old benches are full of soil, the soil should be sterilized or covered with clean plastic sheets to separate it from the potted plants placed on the bench.

#### **Debris from Previous Crops**

Most plant pathogens have a stage in their live histories that can rest in a dormant state and survive periods of time when temperatures are extreme or moisture is not sufficient for growth. Some pathogens have evolved a strategy of becoming dormant in the dead leaves, stems, and roots where they previously caused disease. Inside those tissues they are protected from the hostile environments of the soil and air and are away from competition with other organisms in the soil and air. They have at hand a ready supply of nutrients when conditions become favorable again. Bacteria such as *Erwinia chrysanthemi*, fungi such as *Botrytis* and *Pythium*, foliar nematodes (*Aphelenchoides*), and tobacco mosaic virus, survive for months in plant debris. A disease may recur if infested debris is left in the greenhouse where it may come in contact with the next crop.

#### **Plants Kept All Year**

Some pathogens must have living plant tissues in order to grow, reproduce, and survive. Viruses like tomato spotted wilt and cucumber mosaic only survive in living plant cells. Rusts, such as geranium or fuchsia rust, must pass

from living plants to other living plants or they die within weeks. Powdery mildew fungi may be on grape ivies, begonias, roses, and African violets unnoticed or at a level of severity thought insignificant until they later explode into activity. Similarly, *Botrytis* on geraniums can usually be found on branch stubs and fading leaves and flowers most of the year. When light, humidity, and temperature conditions turn in favor of these pathogens, disease can seem to appear and spread rapidly when, in fact, the problem had been building for some time. Thus, plants kept in the greenhouse all year act as reservoirs of pathogens and should be under strict disease control.

Weeds (especially bittercress and oxalis) fall under this heading as do plants such as *Tradescantia* and English ivy that are allowed to escape and grow under benches. Plants found all year in the greenhouse not only harbor pathogens, they are excellent havens for the thrips, whiteflies, and aphids that can spread diseases.

#### **Vegetatively Propagated Crops**

Cuttings purchased each year may be new to your greenhouse but someone, somewhere had them and the stock plants in the greenhouse all year. Thus, the problems mentioned in the above section apply to vegetatively propagated plants. Any disease affecting stock plants is likely to be found on cuttings taken from those plants, particularly if the pathogens reside inside the plant. Vascular wilt diseases such as bacterial blight of geraniums, *Fusarium* wilt of chrysanthemums and *Verticillium* wilt of impatiens; virus diseases caused by dasheen mosaic, tomato spotted wilt, and tomato ring spot viruses; foliar nematodes in chrysanthemums, begonias, and African violets all will accompany cuttings if stock plants are infected. The propagator must assume responsibility for strictly controlling diseases and insects on stock plants so that these pests are not sold to the customer on the cutting. The customer must inspect purchased material carefully as soon after arrival as possible. If inspection is put off until the plants have been in the greenhouse many days, it is not possible to be certain whether the pathogens accompanied the cuttings or moved to the cuttings from sources within the greenhouse.

Culture indexing systems have been devised to determine that plants are free of major fungi, bacteria, and nematodes affecting the crop and virus indexing was developed to be certain those plants do not harbor the most important viruses that threaten the crop. Once indexed plants are purchased and placed in the producer's greenhouse, it may only be a matter of time before the plants again become infected with the pathogens for which they had been indexed. Indexing does not guarantee the future health of the plant. As the time during which indexed plants are kept in the greenhouse passes, the likelihood that diseases will occur increases.

It is important to realize that indexed plants are only examined for some disease-causing organisms. Culture and virus indexed plants are not necessarily "disease-free". That is, disease-causing organisms other than those for which indexing was done may be present. For example, to my knowledge, no company indexes for *Botrytis*. However, in crops where culture and virus indexing is done, the probability of serious losses due to organisms carried on or in the cuttings is greatly reduced.

#### **Water**

The fungus *Pythium*, which can cause damping-off, root and stem rots, and cutting rots is probably the main pathogen that can be brought into the greenhouse in water. Surface water such as lakes, ponds, rivers, and streams contain *Pythium* primarily in the bottom sediment. Run-off can carry the fungus from the soil into wells. Care should be taken to avoid pumping bottom sediment from water supplies into the greenhouse irrigation system. *Pythium* is a major problem in hydroponic systems. It becomes an important problem in ebb and flow systems when the system is heavily contaminated.

#### **Air**

The spores of powdery mildew fungi, *Botrytis*, rust fungi, *Alternaria*, and others can be carried by air currents from outdoor plants into the greenhouse. Infected plants in nearby gardens and weeds close to the greenhouse can supply enormous numbers of spores. Thus, even if great care is taken to eliminate other sources of pathogens, the air we breathe may carry certain disease-causing organisms. During the warm months, it is critical to maintain greenhouse conditions that inhibit pathogen activity and to eliminate non-crop sources of pathogens around the greenhouse. However, cautious use of herbicides near the greenhouse is called for since many crops have been ruined when herbicide vapors have been drawn in by fans or natural air currents. Since most greenhouse crops are dicotyledenous plants and very few pathogens attack both monocots and dicots, consider establishing a grassy lawn around the greenhouse.

#### **Conclusion**

These are the major sources of living things that cause diseases in greenhouse crops. There are other sources but these are the first to suspect when trying to answer the question "Where did the disease begin?" Every greenhouse manager should be aware of the sources of pathogens for each crop grown in their particular operation and should plan to eliminate those sources of disease. Money can be saved by not losing plants during production and by minimizing the expense of purchasing and applying disease control chemicals. By Gary W. Moorman, Plant Pathologist

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