

Greenhouse Pest Posse

Colorado
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Putting Knowledge to Work

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“What’s current on the pest, disease and production scene”

AIR POLLUTION INJURY?

Air pollution injury is always hard to diagnose, and ultimately, when the diagnostic process leads to this conclusion, it is because all other possible causes have been eliminated. Recently, a Colorado grower experienced some problems with pansy and aster that led the diagnosticians on this “path”.

Damage from air pollutants can be acute (show up right after the incident), or chronic (having effects like growth regulation—symptoms that are more difficult to pin down). Two or more pollutants can cause synergistic effects. Regardless, a plant’s susceptibility to pollutants will generally be greater, the more vigorous its growth. Studies have indicated that a plant under stress will more likely have closed stomates, reducing potential damage. (Most pollutants enter through the stomates.)

There are six common air pollutants including ozone, PAN, sulfur dioxide, nitrogen dioxide, hydrogen fluoride and ethylene. Ethylene may be a pollutant that is more widely known by greenhouse growers. This growth regulator is produced by internal combustion engines. When heaters are not working properly or are not vented correctly, levels of ethylene build up in the greenhouse causing damage to plants.

Curled Easter lily leaves caused by ethylene gas



Ozone is a natural component of the atmosphere at higher elevations, but it is also “made” by the reaction of nitrogen oxides and sunlight. Nitrogen oxides come from motor vehicles and as a result ozone levels can build up in sunny climates such as Colorado.

The Colorado Department of Health and Environment routinely monitors ozone levels and other pollutants around the State. On the days in question when a particular pansy and aster crop showed significant injury, we know that the levels of ozone and other pollutants were elevated.



PAN stands for peroxyacetyl nitrate and is an oxidant formed by chemical reactions between nitrogen dioxide and hydrocarbons in sunlight. The compound is known to cause distortion in plants and repeated doses can cause senescence. Experts at CSU and the University of Wyoming felt that PAN was the most likely cause of the symptoms pictured above. Several factors led to this conclusion: 1) plants in question are known to be susceptible; 2) there was no evidence of disease, nutritional problems, or water quality issues, and heaters had not been used; 3) greenhouse is very close to an interstate highway; 4) levels of ozone and other pollutants were elevated during time of injury; 5) only plants in greenhouses were affected, all plants outside were unaffected; and 6) a hydrogen peroxide compound was run through the pads at the time of elevated pollutant levels, perhaps interacting with those pollutants to form PAN.

Thrips on Poinsettias



Thrips injury may not be common on poinsettias due to the fact that the insects prefer other hosts. However, when there is a large thrips population, they may cause injury on this crop.

Symptoms of thrips injury may manifest themselves in a couple different ways. The classic symptoms is a silver-leeked appearance to leaves or flowers. This happens when adults and larvae feed on the contents of plant cells. The affected cells then fill with air.

The second type of symptom caused by thrips is leaf distortion. This symptom occurs when the insect feeds on small, or newly forming leaves. As the leaf expands or grows the damaged cells do not, resulting in distortion.

Management of thrips can be accomplished with a combination of monitoring, sanitation, screening, biological control agents such as predatory mites and/or applications of insecticides. Labeled products include, but are not limited to: Conserve (Biopesticide), Avid (Glycoside),



larva

adult

Photo The Ohio State University

Mesulafloxacin* (Carbamate), Pedestal, Precision or Imidacloprid (IGR), Orthene* (Organophosphate) or pyrethroids such as Cyfluthrin or Talstar.

Not compatible with biological control

MORE AND MORE ROOT AND CROWN ROT! WHAT ABOUT PREVENTION?

Root and crown rot disease continues to be the number one problem common to most growers. Prevention of these fungal diseases is the key. Prevention strategies include, but are not limited to the use of fungicides. Wouldn't it be nice to reduce the number of applications of fungicides used? Think how much time and money this might save an operation.

Reduction of root and crown rot diseases begins with several basic strategies:

1. Cleanliness or sanitation. Start with a clean greenhouse. — Keep floors free of debris and water puddles. — Use steamed or sterilized media. — Try to avoid recycling containers or plug trays. If you do recycle them, make sure they are thoroughly disinfected between uses. — Control weeds both inside and outside the greenhouse.

2. Don't bring the problem into the



greenhouse.

Inspect all incoming plant material before placing it in the production area. — Purchase plant material from reputable suppliers.

3. Avoid over irrigation and poor drainage issues. Are your most highly paid, or highly trained people on the other end of the hose?—Over watering and low planting depth are the two most important factors in the development of root and crown rot diseases. Roots of crops planted too deeply and/or watered to frequently don't receive enough oxygen. Low oxygen level is a friend to root rot fungi.—Do you grow on the floor? If so, drainage can be an issue and flats or pots often "sit" in water. A simple solution is to raise the flats or containers off the ground on inverted flats.—Check potting medium, is it well drained, well aerated



and does it have an appropriate bulk density?

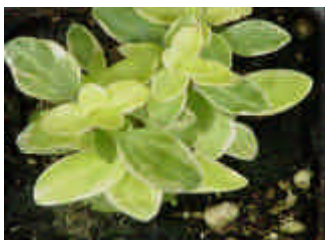
4. Use of biofungicides. These products consist of beneficial fungi or bacteria that should be incorporated into clean potting mixes or soil prior to planting. Once present, the beneficial organisms may out compete pathogens for nutrients, produce products toxic to pathogens or maybe even induce resistance to pathogens. They are not rescue treatments, but are a true example of the word preventive. AND they may not perform well in an over irrigated, poorly drained media. See page 3 for a list of Biofungicides.

DON'T SKIP ROUTINE WATER AND NUTRIENT TESTING!

It is often surprising how many growers do not routinely



check water and media for nutrients, pH and salt (EC) levels. Unfortunately a lack of testing can lead to production problems, that cannot be fixed by



“guessing” how much acid to inject or what type of fertilizer to add.

Water quality may change periodically over the year, depending on drought or other environmental conditions. City water may also change, depending on source of water. Many municipalities change sources during the year. It's best to test monthly or at the least every few months. Don't wait until there is a problem.

Colorado State University, U.S. Department of Agriculture and Adams County cooperating.

Cooperative Extension programs are available to all without discrimination. If trade names are mentioned, it is for educational purposes, endorsement over those products not mentioned is not intended. Read and follow manufacturers directions.

DISTANCE IGR INJURY ON POINSETTIAS

Last issue mentioned distortion on poinsettia leaves. The grower now feels that this damage was caused by the over application of Distance IGR. A 6–8 ounce rate was used for fungus gnat control. Unfortunately, the majority of affected plants are still not growing out of this.



QUESTIONS OR COMMENTS?

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Biofungicides for Root and Crown Rot Disease Prevention

Deny *Burkholdia cepaci*
(Bacterium) Effective against:
Rhizoctonia solani, *Fusarium spp.*,
Pythium spp

Kodiak *Bacillus subtilis*
(Bacterium) Effective against:
Pythium spp and *Rhizoctonia solani*

Mycostop *Streptomyces griseoviridis* strain K61
(Actinomycete) Effective against:
Fusarium spp., *Alternaria brassicola*,
Phomopsis spp., *Botrytis spp.*,
Pythium spp. And *Phytophthora spp.*

PlantShield, RootShield
(Fungus) Effective against:
Pythium spp., *Rhizoctonia solani*,
Fusarium spp. *Thielaviopsis*

SoilGuard *Trichoderma virens*
GL-21 (formerly know as
Gliocladium virens GL 21) (Fungus)
Effective against:
Rhizoctonia solani and *Pythium spp.*

Companion *Bacillus subtilis* GB03
(Bacterium) Effective against:
Rhizoctonia spp., *Pythium spp.*,
Fusarium spp. and *Phytophthora spp.*

Actinovate *Streptomyces lydicus*
strain WYEC 108 (Actinomycete)
Effective against: *Pythium*,
Phytophthora, *Fusarium*,
Rhizoctonia, *Verticillium* and other
root decay fungi.

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Greenhouse Pest Posse

A newsletter designed to keep greenhouse growers informed of current pest, disease and production information. Produced by Laura Pottorff, Regional Greenhouse Specialist, Colorado State University

Want to see the photos in color? Access this publication on the web at: www.colostate.edu/depts/coopext/adams/gh

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ROCKY MOUNTAIN HORTICULTURE SHORT COURSE- OCTOBER 21, 2004— PEST AND DISEASE DIAGNOSIS

The Greenhouse Pest Management School is combining with the Rocky Mountain Horticulture Short Course. This years program will focus on **Diagnosis and Management of Pests and Diseases** . Crops covered will include **poinsettias and ornamental grasses/perennials**. Please join us at the Adams County Extension Office, 9755 Henderson Rd. in Brighton, on October 21.

The classes will be presented in **English (8:30—11:30 a.m.) and in Spanish (1:00—4:00 p.m.)**. Speakers will include Ned Tisserat and Laura Pottorff from CSU (English session) ; Luis Rios, Color Star Growers and Frank Stonaker, CSU (Spanish session). Come ready to learn a lot with hands-on lab sessions and lectures. Sponsored by CGGA and CSUCE. Contact 303-758-6672 to register and for more information.