

**REPORT FOR MINI-GRANT  
2005**

**INTEGRATED PEST MANAGEMENT FOR MASTER  
GARDENERS**

**Grant Recipients**

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**Utah State University Extension Service Extension Agent  
Cache County**

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**Utah State University Extension Service Extension Agent  
Utah County**

**Larry A. Sagers**

**Utah State University Extension Service Horticulture Specialist Thanksgiving  
Point Office**

# Original Grant

## INTEGRATED PEST MANAGEMENT FOR MASTER GARDENERS

### Project leader

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Loralie Cox Utah State University Horticulturist, Utah County  
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### Cooperators

Linden Greenhalgh, Utah State University Extension Agent, Tooele County  
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Utah County Master Gardener Organization  
Thanksgiving Point Advanced Master Gardeners  
Tooele County Master Gardener Organization  
Davis County Master Gardeners  
Salt Lake County Advanced Master Gardeners  
Cache County Master Gardeners

### Situation Statement

Many Master Gardeners volunteer for Utah State University Extension Service each year. Many of these volunteer in diagnostic clinics and some are in counties without horticultural expertise. Many could and would do much more to help Extension programs but they lack diagnostic training.

Most of the Master Gardener classes have less than five hours of training and this is not sufficient training for most volunteers to feel comfortable diagnosing plant problems. There is a critical need to train these Master Gardener Volunteers in pest identification and in Integrated Pest Management.

Providing additional training would better help Master Gardeners to staff diagnostic clinics, do additional workshops and classes incorporating IPM techniques. It would also help them answer questions at Master Gardener booths at state and county fairs, home and garden shows and other venues.

Providing this training is essential to keep Master Gardeners up to date and to keep them excited and motivated to continue to help Utah State University Extension with disseminating horticultural information.

This information will be placed on the USU website but the CD format is very important because Master Gardeners often host clinics where they do not have internet access but computer access is usually available.

### **Objectives**

- Develop diagnostic and IPM training materials to be utilized by Master Gardeners on a statewide basis.
- Provide an Integrated Pest Management and a diagnostic CD to each Master Gardener trained in Utah in 2006.
- Train 100 Utah State University Advanced Master Gardeners in pest identification and advanced IPM practices for trees and shrubs.
- Train 65 Utah State University beginning Master Gardeners in basic IPM practices and in techniques to share those with the public.
- Develop printed fact sheets that outline Integrated Pest Management for distribution by Master Gardeners at educational events.

### **Procedures**

- Train 50 Utah State University Advanced Master Gardeners in advanced diagnostic and pest management techniques emphasizing IPM Practices at workshops to be held on a regional basis between May 15 and September 1, 2005.
- Train 65 Utah State University Extension Beginning Master Gardeners in basic IPM practices and sharing information with the public. Focus IPM technique training to change pesticide use practices and reduce pesticide impacts.
- Develop and implement concise IPM materials for inclusion in the Statewide Master Gardener manual to be used starting September 2005.
- Develop and implement concise, reproducible IPM fact sheets for inclusion in county and State events for 2006.
- Integrated Pest Management information will be disseminated in an article published in a statewide newspaper and two regional newspapers. Similar information will also be provided through the USU information office to all media outlets in the state.
- Offer IPM training on a statewide and regional basis through two radio programs. Include IPM information on web sites for KSL radio and television, and Utah State University.

### **Techniques**

Develop a CD ROM Pest Control, Diagnostics and IPM manual for Horticultural Plants that will be distributed to all advanced Master Gardeners as a resource and as part of their training.

Train Fifty Utah State University Advanced Master Gardeners in advanced diagnostic and IPM techniques in Tooele, Salt Lake, Davis, Cache and Utah Counties. The training will be conducted by USU Extension Horticulture Agents, USU Paraprofessionals and appropriate USU Specialists.

- Classes and training will be done in two parts. They will include classroom sections and outdoor, hands-on clinics.
- The training will be evaluated by pre and post testing to determine the knowledge and skills gained by teaching integrated pest management techniques and diagnostic techniques Master Gardeners.

**Budget**

Audiovisual equipment, supplies, and materials to develop training aides	\$	400.00
Travel	\$	565.00
Workshop supplies and preparation	\$	550.00
Preparation and reproduction of diagnostic and IPM CD	\$	1,000.00
Contract help for preparing diagnostic CD and IPM materials	\$	850.00
<b>Total</b>	<b>\$</b>	<b>3,365.00</b>

**FUNDING SOURCES**

<b>IPM Mini Grant</b>	<b>\$</b>	<b>1,700.00</b>
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**Other Sources**

Funding provided by County Master Gardeners organizations	\$	1,000.00
In-kind contributions from Master Gardeners and USU counties	\$	665.00
<b>Total</b>	<b>\$</b>	<b>3,365.00</b>

## **Training Workshops**

As a part of the Integrated Pest Management Training for Master Gardeners, eight groups of Utah State University Extension Master Gardeners were trained in plant pest diagnostics in courses in May, June, July or August.

Three classes were for basic Master Garden classes, three were for advanced classes and one was done as a statewide training. More than 130 master gardeners were trained in basic or advanced diagnostic skills.

The basic training courses were done for Master Gardener participants at Thanksgiving Point Gardens, Utah County and in Tooele County. These workshops covered insects and diseases, weeds, environmental problems and irrigations problems.

More than 100 beginning master gardeners received both classroom training on plant pathology, entomology and weed science. In addition, they received specific diagnostic training to help them understand and determine what pests they are dealing with. This is critical in determining the pest and implementing a successful IPM program.

Advanced Master Gardeners from Utah, Davis, Tooele, Summit and Salt Lake Counties were trained in diagnosing tree pests and problems in a series of workshops held in May and June at the International Peace Gardens in Slat Lake City.

The hands on workshops covered tree insect pests, pathogenic and non-pathogenic diseases and other genetic problems. The participants identified more than forty problems in the field and learned how to distinguish different causal organisms. More than 100 Advanced Master Gardeners received this training.

The final training was done as a two-day statewide training. (See separate report) It was funded in part by a grant from the USU IPM program and various other sources. Participants were trained in the classroom and by onsite orchard, garden and vegetable farm visits.

These Master Gardeners are the first contact that many clients contact in the USU offices so it is important that they receive good training in diagnostics. I conceived and conducted the training to improve their skills.

Training included ornamental pests, vegetable pests, turfgrass pests and fruit pests. Each participant received diagnostic training guide and will receive the Master Gardener diagnostic CD to help them in clinics and at the Extension offices.

Develop and implement concise IPM materials for inclusion in the Statewide Master Gardener manual to be used starting September 2005. (See Supplemental Materials)

Develop and implement concise, reproducible IPM fact sheets for inclusion in county and State events for 2006. (Next Years Project)

Integrated Pest Management information was disseminated in articles published in a statewide newspaper and regional newspapers. (See Supplemental Material)

Offer IPM training on a statewide and regional basis through two radio programs. Include IPM information on web sites for KSL radio and television, and Utah State University. (See Supplemental Materials)

**Master Gardener Diagnostic Training**  
**June 22, 23-2005**  
**Thanksgiving Point Gardens and Utah County Extension**  
**Office**

The object of the diagnostic training was to train those Master Gardeners, paraprofessional extension service personnel and agents in the art and science of plant problem diagnosis.

These key individuals could then go back to their respective counties and help assist the Extension Agents by diagnosing pests and plant problems and try to get clients to integrate Integrated Pest Management practices.

The participants were trained by the following individuals and in the following subjects.

**Diagnosing Plant Problems by Larry Sagers, Horticulture Specialist Utah State University Extension Service, Thanksgiving Point Office**

In this training, each participant learned how to identify the problem, look for problems, delineate time-development of damage patterns, determine causes of the plant damage whether living-pathogens, insects, mites or non-living-mechanical, physical or chemical causes. They then learned to make a diagnosis to determine the probable cause for the plant failure.

One important concept was teaching what is normal for a plant so that we could better understand if there truly is a problem or if it was a normal function of the plant. This separates real from perceived problems, which is a great help in a good IPM program because many individuals mistakenly apply a pesticide when there is no pest present.

**Turf grass Diseases by Loralie Cox, Utah State University Extension Service Extension Agent, Cache County**

This workshop covered the most common problems in Utah lawns. Potential problems included insect pests, pathogenic diseases and nonpathogenic problems of soil compaction, thatch and fertility.

Cox covered the importance of improving the health of the lawn by good cultural practices so that pesticides could be eliminated or reduced for many problems. Well cared for turf will often withstand outbreaks of a pest without showing damage.

She also emphasized practices that would reduce or prevent weed problems. Turf weeds are often controlled by good watering, mowing and fertilization. If herbicides are needed, the timing

and the application techniques are important to make them more effective and the best chemical treatment for each weed problem.

### **Fruit Insect Pests by Dr. Diane Alston, Utah State University Extension Service Entomologist**

This lecture taught how to make a proper diagnosis. One way to help make an accurate diagnosis is to determine what type of insect is causing the problem. Insect damage is often separated according to the mouthparts of the causal organism. These are chewing, piercing-sucking, boring or gall forming.

A second method is to look at the overall picture. Determine the patterns of decline or injury, what the new growth looks like. Check the roots and the crown conditions to see if they are healthy or soft.

Finally, Alston covered the importance from an IPM standpoint of knowing the correct stage to target insect control and the timing of any chemical application to control the insect. She stressed the importance of keeping records of insect infestations, when they emerge, when the problem was detected and if the infestations warrant any type of control or if natural parasites or predators will control the problem.

### **Diagnostic Resources by Maggie Wolf, Utah State University Extension Service Agent, Salt Lake County**

When diagnosing problems it is helpful to identify what resources are available to help you diagnose problems correctly. Wolf identified and showed the participants how to use various resources that are available to help in the diagnostic clinics.

Part of this presentation include an online list of resources that are on the list of resources on a website [www.utahmastergardeners.org](http://www.utahmastergardeners.org)

### **Diagnostic Training Field Diagnosis on Fruit Dr. Diane Alston, Loralie Cox, Adrian Hinton and Larry A. Sagers**

The onsite instruction was conducted in the field to observe these problems like you would see them in your own yard or as samples that people bring into the Extension Service Office. Participants could find different problems or pests as they toured different sites around Utah County.

The two orchard sites were the Jack Lewis Orchard and Burgess Fruit Farm in Alpine, Utah. Alston, Hinton, and the owner of the orchard showed common pest problems and elaborated on what problems are involved with growing fruit trees in Utah.

## **Diagnostic Training Field Diagnosis on Ornamentals, Loralie Cox, Adrian Hinton, Tony Latimer, Pest Management Specialist for Thanksgiving Point Gardens and Larry A. Sagers**

This training lab was conducted at Thanksgiving Point Gardens and participants toured the gardens while being instructed on Ornamental Plant Problems. Thanksgiving Point Gardens was a great place to conduct this workshop because of the many different kinds of plants available including trees, shrubs, vines, groundcovers as well as annuals and perennials in an excellent garden setting.

The field training is very valuable because even though seeing problems on a slide during a lecture is one thing but to see the problems, to touch and examine them is a much better learning experience.

The tour covered several turf problems including fairy ring, snow mold, sod webworm and several others. Flower problems included cold temperatures, soil fertility, salt, watering problems and transplant shock.

We also examined many different tree problems including the importance of good planting and care practices and how they affect the IPM practices. Crown gall, borers, nutrient deficiencies, transplant problems and different scale and aphid problems were also shown in the gardens.

## **Diagnostic Training Field Diagnosis on Interior Plants Tony Latimer, Pest Management Specialist for Thanksgiving Point Gardens and Larry A. Sagers**

This workshop took place in the conservatory at Thanksgiving Point. We covered numerous interior plant pests including scale, whiteflies, mealybugs, fungus gnats and the diseases of root rot and of sooty mold as well as various environmental problems.

## **Diagnostic Training Field Diagnosis on Vegetable Pests, Adrian Hinton**

This workshop was held at a local commercial vegetable grower's farm. The first part of the instruction covered various crops, variety selection, establishment, irrigation, fertilizer and weed control practices.

Next, the participants learned about the various pest problems in vegetable crops and how to control them. Specific training on the importance of using IPM techniques was emphasized as all of the vegetables are sold for fresh market consumption.

## **Diagnostic Training And How To Use It to Improve Integrated Pest Management Practices, Loralie Cox, Adrian Hinton and Larry A. Sagers**

During this workshop, we reviewed the importance of making the correct diagnosis before implementing any kind of control practices. This workshop was held at the Utah County

Extension Service Office. Additional samples were diagnosed and the participants toured the Utah County Office for Utah State University Extension Service Office. This is the busiest diagnostic clinic in the state and last year it analyzed almost 1000 samples.

Each participant was given a notebook with handout from each lecture for future reference and received a diagnostic CD to assist them in their own counties.

Another reason for conducting the workshop was to let the various diagnosticians and master gardeners get better acquainted so that they can collaborate on further implementing good IPM practices in Utah.

## **Summary**

This two day, statewide diagnostic clinic, trained 40 Master Gardeners, USU paraprofessionals, Extension Agents and professional nursery personnel from Davis, Tooele, Salt Lake, Wasatch, Cache and Utah counties in diagnostic identification and in correct IPM practices for several different crops and many ornamental plants.

They can now better serve the Extension Offices and agents by helping with diagnostic clinics in their own counties and help with training of other gardeners. Training Master Gardeners helps them teach the public correct information on how to identify pest problems. Teaching them good IPM practices helps them implement those, instead of the common mentality that spraying with chemicals is the best way to control any problem.

**AGENDA**  
**Master Gardener Diagnostic Training June 22, 23 - 2005**  
**Thanksgiving Point Gardens**

Schedule - June 22

- 12:45 p.m. Meet at Thanksgiving Point Garden Visitors Center
- 1:00 - 1:10 p.m. Introduction and Hand Out Materials
- 1:10 - 2:10 p.m. Class # 1 Diagnosing Plant Problems (Sagers)
- 2:10 - 2:30 p.m. Class # 2 Plant Diagnostic Resources (Wolf)
- 2:30 - 2:40 p.m. Break
- 2:40 - 3:10 p.m. Class # 3 Identifying Turfgrass Diseases (Cox)
- 3:10 - 4:30 p.m. Class # 4 Diagnosing Insects Pests (Alston)
- 4:45 - 5:45 p.m. Dinner Moyle Park in Alpine
- 6:00 - 8:00 p.m. Diagnostic Tours Jack Lewis' Orchard and Burgess Fruit Farm (Hinton and Alston)
- Best Western Timpanogas Inn - good night!

Schedule - June 23

- 8:00 a.m. Meet at Thanksgiving Point Garden Center
- 8:00 - 10:15 a.m. Diagnosing Ornamental Plant Problems Thanksgiving Point Gardens (Cox, Latimer and Sagers)
- 10:15 a.m. Conservatory at Thanksgiving Point Interior Plant Pests (Latimer and Sagers)
- 11:00 a.m. Vegetable Pest Tour in Orem (Hinton)
- 12:00 noon Utah County Extension Office, 100 East Center, L 600, Provo  
Lunch and Ornamental Plant Disease Diagnostics (Hinton and Sagers)
- 1:30 p.m. Adjourn - HAVE A SAFE JOURNEY HOME!

## Supplemental Materials Section

Broadcast on KSL and placed on the website July 16, 2005

Larry Sagers

Horticultural Specialist

Utah State University Extension Service

Thanksgiving Point Office

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With all of the many pleasures of gardening, it is easy to think we are in charge. However, plants are always at the mercy of Mother Nature and there are always potential problems. With this in mind, read on for a quick course in plant diagnostics.

The "art" of diagnosis is not always easy. Diagnosing a problem is an orderly thinking process proceeding from recognition of a problem through a solution. Your challenge is to gather clues, ask good questions, and make accurate observations of your plants and what happened to them.

Remember that many potential pests and problems can harm your plants. Possible pest problems include insects and other creepy, crawly creatures like mites, slugs and snails and crustaceans. Animals, like rodents, deer, birds and even dogs and cats can damage plants.

Diseases include pathogenic problems caused by living organisms like fungi, bacteria, and viruses. It includes nonpathogenic problems like environmental problems, nutritional problems and many other physical maladies.

To successfully diagnose a plant problem, follow these steps:

1. Identify the plant correctly. If possible, find the scientific name of the plant because the same common names are frequently used for distinctly different plant species. For example, there are many different species of pine trees each with different plant diseases unique to that species.
2. Determine what problems are likely to occur on your plant. One good reference is the Ortho Problem Solver available as a reference at many libraries and most local nurseries or check <http://www.ortho.com> for an online reference.
3. Compare the affected plant with nearby healthy plants to make certain there is a problem. Sometimes normal plants are mistaken to have problems. For example, conspicuous fuzz that is confused with fungus mycelium covers the leaves of a healthy sycamore.
4. Next, determine the distribution of the problem within the garden. Is more than one plant species affected? If so, climate, chemicals, or other cultural factors likely caused the problem. If the condition is distributed uniformly in a low spot in the field or at the edge of a planting, suspect a soil or water factor or toxic chemical. Parasitic diseases and insects progress with time and rarely infect 100% of the plants in an area.

When the problem affects all of the plants in a particular area, the cause of the problem is probably a deficiency or excess of a soil nutrient or problems of drought, frost or hail; or a toxic chemical such as herbicide or air pollution. Plant pathogens rarely cause a condition to appear suddenly. They usually begin at one point and spread slowly to other plants. If the symptoms show up "overnight" or in one or two days, suspect a climatic factor or toxic chemical.

5. Look at the growing history. Have you grown the same plants there year after year? Were there problems growing other species of plants in the same location? Have herbicides or other chemicals been used in the area? Look at the weather history and determine if there have been any unusually cold, hot or wet climatic conditions in the past.

Many above ground symptoms indicate root rot. Small, yellow or wilting leaves, poor terminal growth or little fruit or flower production often indicate root rot. Most of the plant diseases in Utah are caused by soil borne pathogens. Look for dead roots or dead areas in the bark. Healthy roots are white or cream colored. If the insides are brown or black, the plant likely has root rot.

6. Pathogenic diseases are caused by fungi, bacteria, viruses, mycoplasmas and other organisms. These diseases are best controlled by changing the environment. In our area, this is best done by controlling irrigation.

7. Nonpathogenic diseases are not caused by pathogenic organisms. These are environmental problems including temperature extremes, water excesses or deficiencies, nutrient problems or mechanical damage. These diseases are not controlled by fungicides or other chemicals.

8. Insects and related pests fall into two major categories. They either chew your plants or suck out the juices. It seems like these pests would be easy to diagnosis, but pests are often carefully hidden or they may feed only at night. Sometimes the damage is confused with other problems. While most insects are specific to one kind of plant, slugs and snails, grasshoppers and many others feed on many types of crops.

One excellent resource to help you with the many problems that affect your plants is the diagnostic clinics done at Utah State University Extension Service Offices along the Wasatch Front. Extension Agents and Master Gardeners will examine your plants or the pests that are bothering your plants and recommend a solution.

Clinics are held in the counties along the Wasatch Front each week during the summer. Quality plant specimens are vital. Enough representative material is needed to determine the problems. Include root, stems, and leaves of the infected plant, if possible. Make certain that the sample arrives in good shape by bringing the sample to the clinics on the appointed day.

For more information on the times and dates of the diagnostic clinics, contact the USU Extension office in your county. These are listed in the phone directory or available at <http://extension.usu.edu/coop/regions/index.htm>

Most plant problems are preventable. Unfortunately overwatering is a major problem and kills many more plants than drought. For best plant growth keep the soil moist but never wet and make certain that the soil drains properly.

Most plant pests have alternative or nonchemical methods to control them. Spraying often kills the predatory insects and makes the problem worse. Always correctly identify the problem and look at all of the possible solutions.



Broadcast on KSL Radio and placed on their website May 28 2005

Larry Sagers

Horticultural Specialist

Utah State University Extension Service

Thanksgiving Point Office

For additional information read my column in yesterday's Deseret Morning News.

For pictures of all the diseases we are covering, log onto my website at [www.larrysagers.com](http://www.larrysagers.com)

If you see maladies that you do not recognize, it might be "the fungus among us." If you cannot diagnose the problem, check with your local USU Extension Service Office for additional help with plant problems.

The change in the weather has been sudden and abrupt but the spring moisture leaves behind an interesting horticultural legacy. That legacy is the same that gardeners in many parts of the country deal with on an annual basis, specifically plant diseases.

Plant diseases have many causes but the two covered in this article are fungal and bacterial diseases. These are the pest that the cool moist spring has affected the most. Most of these diseases are not normally a problem because our dry climate prevents them from infecting our plants and flourishing here.

Since many of these diseases are not common, you might want to get a little help diagnosing the problems and deciding what if anything can be do. Fortunately, help is available at your local Utah State University Extension Service Office.

Among the many samples coming this spring is sycamore anthracnose. This disease has hit with a vengeance unknown in at least the past twenty years. Virtually every sycamore or London plane tree is showing symptoms.

The symptom most people first notice is that there are no leaves on their trees. Common questions are why are they so late coming out or why are the leaves so small this year? Of course the answer is most of the leaves are dead.

The infection occurs just as the leaf buds start to open. The fungus thrives with the cool temperatures and spreads onto the newly unfolding leaves. The fungus quickly kills the leaves and the tree looks barren.

Although this disease makes the trees look horrible, sycamores are tough trees and are not going to die from the infections. Because it kills the buds and the twigs beyond that point die back, the trees do take on a rather unnatural twiggy appearance.

Although anthracnose is most noticeable on the sycamores, it also shows up on oaks, maples, walnuts, some elm species, walnuts and some other trees. Watch the trees in your landscape for signs of the disease.

If you are thinking about doing something, think again. About all you can do is to mark on your calendar to spray the trees next season when the buds start to open. Repeat the fungicidal sprays every two weeks until we get consistent dry weather.

If you have quaking aspen trees in your landscape you are in for a surprise soon. Aspen leaf spot is another fungal disease that is rampant in cool, moist, spring weather. This disease is interesting because of the delayed onset. The infection starts when the leaf buds unfold in early March.

Large black spots show up months after the infection. These grow together and turn most of the foliage black. When the symptoms appear, it is too late to do anything. Although the trees look horrible, it will not kill large trees.

If you have high value trees, make a note on next year's calendar to spray as the leaves unfold and continue spraying every two weeks until the weather gets warm and dry.

All of the Utah State University Extension Service Offices along the Wasatch Front, conduct weekly diagnostic clinics. For contact information for the counties, log onto <http://extension.usu.edu/cooperative/index.cfm/cid.256/>

Broadcast on KSL Radio and placed on their website 19 June 2005

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Horticultural Specialist  
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Thanksgiving Point Office

#### Fruit Insect Advisory

**CODLING MOTH:** In much of Cache County and high-elevation sites elsewhere, the initial codling moth larval emergence most likely occurred last weekend (June 12th). The rest of northern Utah is experiencing peak egg-hatch, which is “rush hour” for codling moth larval emergence.

The bulk of the first generation eggs will hatch out during this time, and it usually lasts 2-3 weeks. Visit the codling moth phenology table to see current degree-day totals (check for your nearest location and then look in the column that says “DDs Since Biofix”):  
<http://extension.usu.edu/cooperative/ipm/index.cfm/cid.645/tid.921/>.

**PEACH TWIG BORER:** In the warmest sites (Salt Lake County), PTB populations are likely at or beyond 300 DDs. Most growers spray for PTB between 300 and 400 DDs. Most other sites in northern Utah have 4-10 days before they reach 300 DDs. Visit the PTB phenology table to check the projected developmental status of PTB in your area:  
<http://extension.usu.edu/cooperative/ipm/index.cfm/cid.645/tid.924/>. (Bear in mind that when the high temperature for a given day reaches the mid 80’s and the nighttime low hits the mid-50’s, you can expect 15-20 degree-days for the day.)

**WESTERN CHERRY FRUIT FLY:** As the cherries begin to yellow and take on a pink blush, they become soft enough for WCFF females to insert their eggs. Continue to keep trees protected, and be aware that rain events can shorten treatment intervals.

**LYGUS AND OTHER CAT-FACERS:** Keep an eye out for lygus bugs and stink bugs, particularly in orchards near open hillsides and alfalfa fields. Adult lygus bugs have been observed in peach canopies in Utah County. Their feeding damage causes cat-facing of peaches and apples. Sweeps of orchard groundcover or roadside vegetation will help determine if they’re present. Most broad-spectrum insecticides work well for these insects.

#### Disease Advisory

**FIRE BLIGHT:** Fire blight infections have been observed in Utah Co. apples and Davis Co. pears. Pruning out these strikes will remove the infection and reduce subsequent shoot blight infections.

**PEACH LEAF CURL:** Despite its rarity in Utah, this fungal disease of peaches is showing up in a few isolated instances. Please visit the USU Extension Photo Gallery for images of peach leaf curl: <http://eureka.ext.usu.edu/admin/plugin.cfm?id=2&img=405&gid=53> . Fall and/or early

spring applications of copper or chlorothalonil are good management approaches for this disease. Sanitation and cultural practices are ineffective.

Broadcast on KSL Radio and placed on their website June 25, 2005

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In order to understand and use any pesticide product, it is important to understand the products available to home gardeners. Because of the high numbers of questions we have had the past few weeks on plant diseases, we are providing this information on common fungicides for plant disease control.

Always practice good Integrated Pest Management practices that include using non-pesticide alternatives to chemical controls. Always read and follow all pesticide label information.

#### Home Garden Fungicides for Disease Control

Controlling plant diseases is often a confusing and difficult task. The recommendation to spray a fungicide often adds to the confusion because many registered fungicides are not readily available to home gardeners.

Several companies cater to the backyard grower. In Utah, these companies include Ortho, Lily Miller, Green Light, HiYield, Fertilome and Spectricide, Monterey and Cooke. Fungicide names are confusing. Plant pathologists usually use the general or common name such as chlorothalonil.

Manufacturers and retailers use trade names. For example, chlorothalonil is packaged as Daconil or Ortho Multi-Purpose Fungicide for the home market and as Bravo for commercial markets.

There are differences in the formulation (such as a liquid or powder); for ingredient and in how it is used (as a spray or drench, for example). Some products have more than one type of chemical together. The ingredient list on the label will tell you what is in the product.

Triadimefon (Bayleton) An excellent curative and preventive fungus control for lawns but only available as granules.

Captan – An excellent general-purpose fungicide that controls many plant diseases. It is not effective on powdery mildews and rusts. Use it as a spray, dust, dip, or seed treatment. Captan is labeled for ornamentals, lawns, vegetables, and fruit but only when mixed with other pesticides. It controls leaf spots, blights, and fruit and vegetable rots.

Chlorothalonil (Daconil, Ortho Multi-Purpose Fungicide) - Another good, general-purpose fungicide for foliar fungal diseases as it breaks down rapidly in soil. It lasts well and is labeled for vegetables, fruits, and many ornamentals including shade trees. Allergic people may develop skin rashes.

Copper based compounds (Bordeaux mixture, Microcop) - There are many copper products, but copper sulfate is the most common. Bordeaux mixture, made by adding copper sulfate and

calcium hydroxide to water, was the first fungicide and was used extensively in France to control downy mildew on grapes.

It is a highly effective because it stays on the plant surface even after rain. It is often used as a dormant spray since it may burn tender plant tissues. Copper controls many fungal and bacterial diseases including cankers, galls, blights, and leaf spots. It is not effective against powdery mildews. It is widely recommended because it has no tolerance levels because it has low toxicity and insolubility in water.

Horticultural Oils (Neem Oils such as Rose Defense, Sunspray Ultra-Fine Year-Round Pesticidal Oil) – These include petroleum oils and plant oils. These are effective if powdery mildew is severe and they will eradicate the fungi if you thoroughly cover the plant surfaces. Do not use when plants are wet from rain, irrigation or dew.

Mancozeb (Green Light Broad Spectrum Mannose Fungicide) – A difficult fungicide to find in the stores but is effective on many fungal diseases. Registered for use on lawns, fruits, vegetables and ornamentals.

Myclobutanil (Immunox, Spectricide) - One of the most effective fungicides available to homeowners particularly against powdery mildew. It is also effective against rusts and many leaf spots. Apply to the plant foliage and rotate with other fungicides to prevent pest resistance.

PCNB (Hi-Yield Turf and Ornamental Fungicide) – Primarily for snow mold on turf and for bulbs.

Soaps (Safer's Insecticidal Soap) – Soaps help control powdery mildew and soft bodied insects. Thorough coverage of the plant surfaces is essential.

Sodium or Potassium Bicarbonates (Remedy) - Sodium bicarbonate is baking soda and potassium bicarbonates are used to prevent salt build up from the sodium form. Not as effective as other fungicides but better than nothing. Usually used with oils, which increase their effectiveness.

Sulfur (many formulations containing the word sulfur.) - Elemental sulfur is active against powdery mildews, some rusts, leaf blights, and fruit rots and is labeled for fruits, beans, and many ornamentals. Disadvantages are a short effective control time and specific temperature restrictions.

Sulfur is active as a vapor at higher temperatures but when the temperature is over 85 °F, some foliar burn is likely. At low temperatures, there is no fungicidal activity. 'Concord' grapes or apricots are sulfur sensitive and will burn at any temperature. Often leaves and objectionable residue on the plants and is caustic to skin.

Tebuconazole (Bayer Advanced Garden Disease Control for Roses, Flowers & Shrubs) cures, stops and prevents plant diseases. It is systemic and provides rainproof protection against most common plant diseases such as black spot, powdery mildew, rust and other diseases.

Thiophanate methyl (Green Light Systemic Fungicide, Halt) - A close relative to benomyl (Benlate) It is registered on ornamentals, lawns and some fruit trees.

Triforine (Funginex) - A locally systemic fungicide that controls powdery mildew, rusts, and some leaf spots or blights. It is labeled for use on several ornamental plants and is used to control important rose diseases.

The label is the legal document. No matter what anyone else says, always follow label directions. To do otherwise is against the law.

Friday, May 27, 2005

Wet spring has left a legacy of fungal, bacterial diseases

Sycamore anthracnose, black spot among maladies

**By Larry A. Sagers**

Deseret Morning News



The change in the weather has been sudden, but the spring moisture leaves behind an interesting horticultural legacy, one that gardeners in many parts of the country deal with on an annual basis: plant diseases.

Plant diseases have many causes, but today we'll discuss only fungal and bacterial diseases. Normally, these diseases aren't a problem because of our dry climate, but our cool, moist spring has changed that.

Since many of these diseases that are cropping up aren't common, you might want to get help diagnosing them. Fortunately, help is available at your local Utah State University Extension Service Office.



Larry A. Sagers

Carolyn Boogaard, a master gardener and instructor, examines blight on a tree.

Carolyn Boogaard is one of the many trained individuals who help diagnose problems at the plant pest clinics. She, like most of the others, is a trained master gardener and has completed four years of advanced master gardener training.

Boogaard, an avid gardener with her own delightful landscape, teaches horticulture classes and workshops. She currently works in the USU Salt Lake County Extension Office, where she examines samples and responds to phone calls from those seeking horticulture advice.

Among the many samples coming across her desk this spring is sycamore anthracnose. This disease, not seen in Utah for at least 20 years,

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has hit with a vengeance. Virtually every sycamore or London plane tree is showing symptoms.

The symptom most notice first is that there are no leaves on their trees. Common questions include, "Why are they so late coming out?" or "Why are the leaves so small this year?" Of course the answer is most of the leaves are dead. The infection occurs just as the leaf buds start to open. The fungus thrives with the cool temperatures and spreads to the newly unfolding leaves. The fungus quickly kills the leaves, and the tree looks barren.

Although this disease makes the trees look horrible, sycamores are tough and won't die from the infection.

Although anthracnose is most noticeable on sycamores, it also shows up on oaks, maples, walnuts, some elm species and walnuts. Watch the trees for signs of the disease.

If you are thinking about doing something about it, think again. About all you can do is spray the trees with a fungicide next season when the buds start to open. Repeat every two weeks until the weather turns consistently dry.



Larry A. Sagers

Plant shows rose black spot symptoms.

Nationally, black spot is one of the most serious diseases that affects roses. During my horticulture career, I have maintained black spot on roses is not a problem in Utah because of our climate. I am making no such statement this season. Half of the plants in one rose garden I visited recently showed signs of the disease.

Again, the options to control the disease are limited. If possible, don't water your roses with sprinklers, as that spreads the disease. Fungicidal sprays will protect unfolding leaves that continue to show symptoms. Roses grow throughout the season, so protecting new leaves is effective. With luck, the dry weather will likely have the same effect.

Rose rust, another uncommon disease, is also cropping up. Rose rust spots the leaves, but the spots are bright orange, not black. The control measures are similar to black spot, and problems will diminish as the weather dries out.

If you have quaking aspen in your landscape, you are soon in for a

surprise. Aspen leaf spot is another fungal disease that is rampant with cool, moist, spring weather. This disease is interesting because of the delayed onset. The infection starts when the leaf buds unfold in early March.

Large black spots show up months after the infection. These grow together and turn most of the foliage black. When the symptoms appear, it is too late to do anything. Although the trees look horrible, it will not kill large trees. If you have high-value trees, make a note on next year's calendar to spray as the leaves unfold and continue spraying every two weeks until the weather gets warm and dry.

Coryneum blight — or shot-hole disease — is a serious fungal disease that affects all of the stone fruits, including the ornamental forms. The trees show three distinct symptoms, depending on where and when the infection occurs.



Larry A. Sagers

Coryneum blight on a peach tree.

On peaches, look for small gumming areas around the buds on last year's growth. As buds are infected, they die and the fungus spreads and girdles the twigs, so they die, too. This leaves an abundance of dead twigs in your trees. Prune these out as soon as possible to reduce future infections.

Your apricot fruit is likely already covered with tiny spots. These purple or brown spots make the fruit look unsightly, but they're not harmful. Peel the fruit or use them to make juice if the spots bother you. To prevent infections in the future, spray when the fruits are the size of a pea.

The last symptom gives the tree its common name of shot-hole disease. Small BB-size holes appear in the leaves of any of the stone fruits. Spraying helps control the problem, but it must be applied in the fall when the leaves are dropping.

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*Larry Sagers is the regional horticulturist, Utah State University Extension Service, at Thanksgiving Point.*

Friday, June 17, 2005

## Fungi infesting Utah turf-grass

**By Larry A. Sagers**

Deseret Morning News



If you are seeing spots, perhaps it's time you visit the eye doctor. Then again, if the spots are on your lawn, they are coming from one of several fungal diseases that might be attacking your grass this season.

During the past 15 years, I've written very little about turf grass. In fact, in the past I've stated that "with proper management, turf-grass diseases are of little problem in Utah."

But then came this year's wet, cool spring. The abundant moisture has caused many problems in our lawns that are similar to those experienced in the Northeast or Northwest, where the rainfall is much higher and the temperatures much cooler than what is normally found in Utah.



Larry Sagers

A lawn with leaf spot. Leaf infections are most common in cooler months, spread by wind, rain or clippings.

Major turf-grass diseases are caused by fungi. These pathogens attack both the roots and the leaves. The symptoms appear as spots of dead grass.

Of all of the pest problems I have dealt with over the years, turf-grass diseases are usually the worst. They often produce symptoms that are hard to recognize, and the pathogens themselves can only be identified in a laboratory.

I cannot stress strongly enough that you need to get the problem identified correctly before undertaking a control program. Even after the diseases are identified, control measures are not always effective, and it may take considerable time before your grass recovers.

No single fungicide works on all diseases. If you use the wrong product, you'll waste time and money. In some cases, using the wrong fungicide can

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make the disease worse. The following turfgrass diseases are those most likely to show up in your lawn right now.

Melting out is just what it sounds like: Your grass starts to grow well in the spring and then when warm weather comes, it fades — or melts — away. It appears to need water and yet more water doesn't help — it often makes it worse.

This disease attacks bluegrass and perennial ryegrass. The fungus survives in plant debris or infected plants. Leaf infections are most common in cooler months and the disease spreads by wind, splashing rain, grass clippings or by equipment. The problem is aggravated on lawns that are cut too short.

Necrotic ringspot is another aggravating disease that attacks bluegrass and fine fescue. It has become a problem particularly on 2- to 5-year-old Kentucky bluegrass turf established from sod. Turf established from seed also has shown the disease, but much less frequently. The fungus infects roots and rhizomes, covering them with dark strands of fungal growth. It overwinters in infected plant material.



Larry Sagers

Mushrooms on lawns are mostly annoying, although some are foul-smelling and a few are poisonous.

The symptoms are dead circles and arcs ranging from several inches to several feet in diameter. These start to show up as soon as the grass gets under stress. Weeds or resistant grass species often grow back in the dead-turf area.

Necrotic ringspot can be confused with fusarium patch, because the diseases have similar foliar symptoms. Unlike the fusarium, the symptoms of which usually subside in late spring, necrotic ringspot can occur throughout the growing season.

Fairy rings are circles of darker-green, faster-growing turf grass — often with a ring of thin or dead grass inside or outside. They range from two to several hundred feet in diameter. The fungi may prevent water from penetrating the soil, creating the dead ring.

Fairy ring is caused by many soil-inhabiting mushroom fungi that grow extensively near the ring. Growth usually starts with a germinating spore at a central point, and the fungi grow outward at the rate of a few inches to 2 feet or more per year.

Mushrooms (toadstools) and puffballs often grow throughout the lawn without being associated with fairy rings. They are mostly annoying, although

some are foul-smelling and a few are poisonous and a menace to children and pets.

Mushrooms are the fruiting structures of various kinds of fungi. These fungi grow on decaying organic material in the soil. They are commonly found in areas with buried tree stumps, dead roots, logs, boards, or a thick thatch following heavy rains or watering.

These fungi are hard to control until the organic matter they grow on has decayed. It is seldom practical to dig up the rotting wood or other debris. Rake off or mow off the mushrooms and let the fungus decay the material so the mushrooms will disappear.



Larry Sagers

Fairy ring is caused by soil-inhabiting mushroom fungi that grow extensively near the ring. The fungi may prevent water from penetrating soil.

The following cultural control measures apply to most fungal diseases that attack lawns in Utah.

- Avoid excess soluble nitrogen through fall and winter and spring. Use slow release fertilizers, including sulfur-coated urea.
- Raise your mower height to mow bluegrass 3-3.5 inches high and mow frequently enough to avoid removing more than one third of the grass blade at each mowing.
- Aerate your lawn to control excess thatch, to reduce soil compaction and to allow the water to penetrate.
- Water your lawns deeply and infrequently. Light, shallow irrigation on a daily basis makes your lawn highly susceptible to fungal infections. Dry warm conditions control most lawn fungi.
- Some types of grass and some varieties of grass are more resistant to diseases than others. If problems persist, overseed with resistant varieties.

With time, the spots should disappear and your lawn will look good again.

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*Larry Sagers is the regional horticulturist, Utah State University Extension*

*Service, at Thanksgiving Point.*

By Diane Sagers  
Correspondent Tooele Transcript  
Thursday, 25 August 2005

## **Garden hypochondriacs may cause more harm than help**

A hypochondriac is defined as "A person having an excessive preoccupation with real or fancied ailments."

Are you a garden hypochondriac? Do you worry about every leaf that falls? Do you feel a need to treat for every bug that you see? Do you feel a need to apply "preventive" garden "medications?"

Garden hypochondriacs are prone to overreact, over-spray, and over-treat garden "problems" and in many cases they not only aggravate the original problem, they create others.

Life is a continuum & plants are born, they live and they die in their natural order. Not every problem that besets them needs treatment. Treat some conditions to prolong and improve plant life. Others are part of the natural process and should be left alone and allowed to happen.

To avoid plant hypochondria, try taking a step back and look at your plants objectively. Ask yourself three questions.

¥ Is anything really wrong?

¥ Does it matter?

¥ Is it life threatening?

Truthfully, many problems that face our plants are natural, not life threatening. Evergreens, for example, do lose their leaves and needles, but they do it gradually over time. An older evergreen will generally drop needles in the center of the tree. It does not matter if an insect takes a couple of bites out of a few leaves of a shrub. It will barely show and the plant will grow more leaves to compensate. Some plants can take considerable buffeting from insects, diseases and other pests and still survive.

To avoid over-reacting to plant problems, adopt an IPM philosophy. IPM stands for Integrated Pest Management.

IPM considers social, environmental, and monetary costs. Interest in IPM methods is usually based on a desire to limit pesticides. However, pesticide use is one IPM technique that is used when appropriate. Its philosophy is pest management rather than an attempt at pest eradication. It takes the stance that appropriate neglect will allow Nature to take care of a host of problems and appropriate, timely care will prevent many more. Those who practice IPM will take strong measures only when a pest or problem is a true threat to the health or long-term appearance of a plant.

There are two thresholds to consider & economic and aesthetic. The Economic Threshold is the point when damage justifies the control costs. When pest populations cause damage, decide whether to initiate control measures or accept increased losses. Most of us can live with a few wormy apples, but we do not want most or our entire crop to be affected.

The Aesthetic Threshold is the point at which pest populations cause unacceptable visible damage to ornamental plants.

From an aesthetic standpoint, when does a condition make a plant look bad enough to require an attempt to fix the problem? Two bugs or three withered leaves are not grounds to put on a full-fledge chemical application for pest control.

Most landscape IPM programs:

¥ Stress plant health to reduce pest management costs. Healthy, vigorous plants tolerate or avoid pests. Never use pesticides to compensate for problems related to poor culture.

¥ Use a variety of techniques including sanitation, cultural controls and pesticides. Coordinate these with natural plant healing processes or natural biological controls.

¥ Monitor pest problems to make sound pest management decisions. This detects pest population increases or declines to target treatments to needed areas. Monitoring gives proper pest control timing.

¥ Use IPM techniques to manage pests at acceptable levels rather than eliminate them. Some pests are tolerable if the injury level remains below where control costs exceed the threatened damage. In ornamentals, the damaging level of pest injury is often obscured by aesthetic considerations.

¥ Recognize that requirements for plant health maintenance are separate from artificial aesthetic requirements. Some levels of injury are so low that there is no reason to control the pests.

¥ Give priority to techniques that reduce environmental injury. Environmental costs of pest management are important considerations.

¥ Avoid "Insurance" applications that are not compatible with IPM. Use preventive applications only where the potential for pest injury is predictable and where options do not exist after

infestations occur (for example, borers or bark beetles on high-risk trees).

The goal of IPM is to reduce the number of problems to what we can live with.

IPM principles provide an order of effectiveness for controls starting with the least invasive.

### Biological controls

Biological controls allow nature to take its course. Given time, for example, predatory insects such as lady bugs may move in and feed on aphids or other pests offering controls over time. All that is required on our part is the patience to let the natural controls catch up with the problem.

### Cultural controls

Cultural controls call for leaving problem plants out of the landscape scheme or rotating plants from area to area to keep them away as much as possible from previous years' problems. Tilling up unused areas and keeping weeds down will reduce populations of some insects such as grasshoppers in the overall landscape. Changing the growing conditions reduces many problems. For example, reducing water will reduce problems with root rot. Cutting grass to 2 1/2 to 3 inches rather than cutting it to an inch tall will shade the roots, reduce water use and weed infestations. Leaving the clippings on the lawn after mowing reduces the amount of fertilizer required during the season.

Use plants that are resistant to problems. Some plants are naturally resistant to pests and diseases while others have had resistance bred into them. Check seed packages to determine bred-in resistance.

### Quarantine problem plants

This works most effectively in the greenhouse where one can move diseased or infested potted plants away from other plants. However, in the yard and garden it might mean pulling out diseased or infested plants to avoid spreading the problems to nearby growth.

Sanitation will also help this problem. Remove diseased leaves and infested fruits that may fall from the plant and spread the disease to other plants. Remove infested weeds.

Pruning dead and diseased branches from trees improves their looks and may remove pests that caused the damage. Proper pruning may also strengthen trees.

### Mechanical controls

Mechanical controls are just as effective on pests now as ever. Fly swatters still dispatch numerous flies and two stones pressed together with an insect between are still effective.

Simply washing insects off plants may sometimes offer a measure of control as in the case of

spider mites.

### Chemical controls

When the damage caused by disease and infestation reaches a point to decimate a valuable plant or garden, or you have reached the aesthetic threshold where you cannot live with the looks of a plant, drastic measures are required. When the first four options will not resolve the problem, turn to chemical controls.

Consider the economic threshold of treating a plant for a given disease. Is it more expensive to treat a plant, a disease, a pest or a condition than the plant or yield is worth? Farmers typically consider this. If it costs \$10 an acre to treat a pest and they have 50 acres to treat, they think hard about the yield of that 50 acres and the other expenses involved in preparing for harvest before they apply \$500 worth of spray for a pest that is not going to cause \$500 worth of damage to the crop.

Homeowners, on the other hand, are dealing with small footage. They may spend \$10 on a bottle of spray for a pest or disease, use only part of it and waste the rest. It does not seem like much to spend but can be a very expensive way to save a \$2 plant.

Keep in mind that chemical controls are only temporary, and they always affect other things. Insecticides designed to keep harmful insects at bay also damage beneficial insects. Always use care when using insecticides to avoid harming bees. Miticides kill predatory mites along with harmful mites. Without predatory mites to help with control, the harmful varieties may come back with a vengeance making repeated sprays necessary for the rest of the summer.

Herbicides can drift and cause damage to plants for which they were not intended. Never spray any pesticide on a windy or breezy day and avoid spraying herbicides in very hot weather.

When choosing and using a pesticide consider the following guidelines.

¥ Is this pesticide safe where and how it is used?

¥ Is the pesticide likely to harm the plant being protected?

¥ Will the pesticide kill beneficial insects or animals?

¥ Are label directions for using the pesticide for this purpose easily understood?

¥ When is the best time to use this pesticide?

¥ How and to what is the pesticide applied?

¥ Is the pesticide registered with the EPA for this use? Check the label for registered uses.

There are two kinds of plant diseases: pathogenic and non-pathogenic.

Pathogenic disease involves various microscopic pathogens. More than 100,000 types of fungi exist, there are more than 10,000 bacteria and 50 to 100 mycoplasmas. Viruses are not serious on established ornamentals, but can affect raspberries, strawberries and other fruiting shrubs. Nematodes can create problems in some areas, but are generally not a serious problem here.

Nonpathogenic diseases involve environmental conditions and outside forces.

Although there are 50 thousand different kinds of insects in Utah, relatively few cause damage and many of these are selective. Slugs and snails are a season-long problem. Spider mites are problems during the hot season only. Grasshoppers, crickets, cutworms and armyworms increase and decrease in numbers in cycles. Tomato hornworm, cabbage loopers, corn earworms and the like generally damage only selected plants.

Water is often a nonpathogenic disease problem. It is ironic that in Utah, the second driest state in the country, overwatering is such a problem. Lawns and most landscape plants require about 36 inches of water during a growing season, but typically, they receive at least twice that much or more. Overwatering encourages root rot and cuts off supplies of air in the soil. If roots are damaged or rotted, they do not take enough moisture up to supply the top of the plant and the plant will wilt the same as if there is not enough water in the soil.

If an established tree or shrub defoliates in the middle of the summer, check the roots. It may have been over watered and developed root rot or it could have encircling roots, or wire or twine may have been left on when it was planted. Anything that damages roots will affect the top of the plant.

Take good care of your plants by avoiding plant hypochondria.

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