

Final Report – IPM/SA Mini-Grant

Preventing Unnecessary Pesticide Applications by Correctly Identifying Abiotic Diseases and Environmental Stresses in Woody Ornamentals

Project leaders

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Cooperators

Utah State Pest Control Association
Utah Botanical Center
Ogden Botanic Gardens
Utah County Master Gardeners
Thanksgiving Point Advanced Master Gardeners
Tooele County Master Gardener Organization
Davis County Master Gardeners

Situation Statement

Woody landscape plants make up the backbone of home landscapes. These plants are arguably the most expensive investment for homeowners and are commonly managed improperly, including unnecessary applications of pesticides. Improper maintenance and pesticide applications, along with poor selection of plant material, often lead to unnecessary plant stresses. As these stresses are superimposed on woody landscape plants, disorders such as nutrient deficiencies, temperature and environmental extremes, mechanical damage, excessive salts, and chemical damage causes the plants to become more susceptible to other problems such as secondary infestations of insects and diseases.

Many homeowners and Professional Control Operators (PCO's) apply pesticides to control insects and diseases that have come in as secondary invaders to abiotic disorders and environmental stresses. This common practice is not only non-productive - it is environmentally irresponsible.

Training homeowners and PCO's how to recognize and diagnose abiotic diseases and environmental stresses will help them consider proper control measures. Also, by proper plant selection and proper maintenance of their landscape plants or those of their clients, the unnecessary use of pesticides in many cases can be averted.

Report Accomplishments

The focus of this project has been two-fold. First, a program was to be developed to train homeowners, USU Master Gardener volunteers and Professional Control Operators (PCO's) to properly identify abiotic diseases associated with woody plants. The second focus of the project was to develop educational supplements and other teaching aids to share with other USU Extension Agents to utilize within their own counties.

Project Accomplishment 1

-Municipal Urban Forestry Training-

In cooperation with Jerry Goodspeed, (Weber County Extension Agent), a two-day training was held on May 15th and 16th for urban forestry professionals from municipalities of Davis and Weber Counties. The training focused on basic anatomy of woody plants, proper plant selection, identification of common pests/diseases, and hazard/liability issues. The training also offered hands-on workshop activities to increase participants' basic diagnostic skills and offered pruning and planting demonstrations. Of the 29 cities within the two counties, 12 of them sent representative professionals. In all, 22 individuals were trained regarding correct diagnosis and implementation of Integrated Pest Management Practices in their areas of work. Each municipality from Davis and Weber Counties also received a "Top 10 Abiotic Diseases" poster to display in their work area as a visual reminder of the training.

Project Accomplishment 2

-Top 10 Abiotic Diseases Poster / Fact Sheet-

An educational poster, "Top 10 Abiotic Diseases" was created by JayDee Gunnell and Jerry Goodspeed. The poster highlights common disorders associated with woody plants due to non-living environmental factors. Posters have been disseminated to 29 cities and municipalities of Davis and Weber Counties. USU Extension Agents contributing to this project have also received a poster to display in their respective county offices. Other Extension Agents have expressed interest in having a poster to display in their county offices as well. A pdf file of the poster has been posted on the Davis County website, <http://extension.usu.edu/davis> under "Horticulture - Recent Publications" for those interested in printing a poster. The poster has also been submitted to be published as a USU Fact Sheet and is currently going through the peer review process.

Project Accomplishment 3

-Abiotic Disease of Woody Plants Presentations-

There were eight presentations given this past year in conjunction with the IPM Grant Project. The presentations focused on reducing pesticide use by correctly identifying and treating abiotic diseases associated with woody plants. The presentations were given to Master Gardener volunteer groups, Extension Professionals, and Professional Control Operators (PCO's).

- On January 25th, JayDee Gunnell gave a presentation to 35 members of the Utah Pest and Lawn Care Association at their annual meeting in Salt Lake City.
- On May 15th – 16th, JayDee Gunnell presented the "Top 10 Abiotic Diseases" poster to 22 city park managers from Davis and Weber Counties at the Municipal Urban Forestry Training held at the Ogden Botanical Gardens and the Utah Botanical Center.

- On June 7th, JayDee Gunnell presented the “Top 10 Abiotic Diseases” poster to 20 Master Gardeners from around the state at the Annual State Master Gardener Conference in Brigham City.
- On September 4th, Larry Sagers and JayDee Gunnell gave presentations to 40 members of the Utah Pest and Lawn Care Association at their summer meetings at Thanksgiving Point. These presentations focused on correct diagnosis and treatment of diseases and other IPM practices. An evaluation of the meetings showed that participants found the training to be good to excellent and planned on sharing the knowledge gained with another 1,300 customers and associates.
- On October 1st, Larry Sagers and JayDee Gunnell gave presentations, also held at Thanksgiving Point, to 45 members of the Utah Parks and Cemeteries Association. While much of the information presented was geared towards turfgrass, the participants were also educated concerning abiotic tree diseases. An evaluation of the meeting showed that the participants thought the training was very good to excellent (4.6).
- On October 9th, JayDee Gunnell gave a presentation to 90 tree care professionals at a pesticide applicators workshop hosted by the Utah Community Forest Council and the International Society of Arboriculture – Utah Chapter in Salt Lake City.
- Jerry Goodspeed was also able to give training regarding abiotic tree diseases to 40 Master Gardeners from Weber County during one of his volunteer training sessions.
- Jerry Goodspeed and JayDee Gunnell were also able to give a professional presentation to 15 Extension Agents from different western states at the Western Regional Agriculture Agents Meeting in Prineville, Oregon on October 15th. The presentation covered how the “Top 10 Abiotic Diseases” poster was instrumental in training municipal workers.

In all, over 330 individuals were educated regarding how to correctly diagnose abiotic diseases associated with woody plants along with sound IPM practices and treatments for those diseases.

Project Accomplishment 4

-Top 10 Abiotic Diseases PowerPoint Presentation-

As partial fulfillment of the requirements of the IPM Grant, JayDee Gunnell (along with Jerry Goodspeed), developed a PowerPoint presentation highlighting the most commonly encountered abiotic diseases associated with woody plants. The presentation contained over 30 pictures with symptoms, causes, and remedies of these common diseases.

Project Accomplishment 5

-Newspapers and Media-

Newspapers and media are important outlets for reaching the public. In fulfilling the objectives of the IPM Grant, both newspaper and radio were utilized in educating the public concerning common abiotic diseases associated with woody plants in the landscape.

Larry Sagers wrote a newspaper article concerning how rapid weather changes are hard on plants. The article appeared in the Deseret Morning News on June 27th, 2008. The paper has a circulation of about 55,000 and a readership of about 125,000.

JayDee Gunnell wrote an article on how to avoid abiotic problems associated with summer heat stress. JayDee Gunnell submitted it to three local papers as well as to Julene Reese at the USU Press Office on July 14th. However, the article was not published. Both articles have been attached at the end of the report.

Larry Sagers is co-host of the KSL Greenhouse Show on Saturday mornings from 8am to 11am. Larry consistently educates homeowners concerning how they can reduce pesticide use by correctly identifying pest/disease problems, implementing softer solutions consistent with IPM practices, as well as discussing the importance of making the right choice in plant material to avoid abiotic problems.

There were a total of 13 of these radio programs throughout the season. Larry had Marion Murray on the program as a featured guest on August 30th. They discussed topics regarding Integrated Pest Management. JayDee Gunnell was a featured guest on the KSL Greenhouse Show with Larry Sagers on two different occasions. On June 7th, JayDee talked about abiotic (non-living) diseases of woody plants. He discussed with the listeners how to diagnose the problems associated with iron chlorosis, planting trees too deep, and soil problems. JayDee also encouraged them to avoid unnecessary applications of pesticides.

On June 21st, JayDee Gunnell talked about abiotic diseases of woody plants that were commonly brought into the Diagnostic Clinics. JayDee discussed with the listeners how to diagnose the problems associated with extreme heat along with avoiding broadleaf weed killer applications. There is an estimated 50,000 listeners per qum (per quarter hour) on the KSL Greenhouse Show.

Beating the Heat

JayDee Gunnell
Horticulture Agent
Utah State University Extension

Recent spikes in the temperature have not only caused the mercury in the thermostat to rise, but they have also brought an increased number of pathetic-looking samples to be analyzed at the Utah State University Plant Diagnostic Clinics. These diagnostic clinics are offered by many USU Extension Offices along the Wasatch Front. Diagnosing plant ailments can be a daunting and frustrating task--symptoms and causes associated with plant problems are not always easy to determine.

Symptoms are a plant's general response to any given stress. They can include yellowing leaves, marginal burning, stunted growth, brown spots, and branch die-back with the ultimate symptom being death. Most people don't notice the problems until the symptoms are severe. This usually puts them in panic mode, which in turn leads to the most popular question I hear homeowners ask, "What chemical can I spray to fix the problem?" Truth be known, there is often no quick fix for plant problems.

Many of the problems and plant samples that are brought into the Extension Office are actually abiotic or caused by non-living influences. These problems consist of environmental stresses, temperature extremes, physical or mechanical damage, improper watering, and chemical damage. Though these abiotic disorders are often innocently superimposed on plants by well-meaning people, they can be detrimental to the long-term survivability of plants.

The old adage, "an ounce of prevention is worth a pound of cure," is worth its weight in gold when it comes to having healthy landscape plants. Following are three tips on how to reduce some of these abiotic plant stresses and in turn help them beat the heat of summer.

1- Proper Plant Selection:

Different plants have different growing requirements. Shade-loving plants like Japanese maples, hosta, coral bell, yews, along with many of the broad-leaf evergreens such as, laurels, boxwood, and photinia can get "sunburned" leaves if they receive too much solar exposure. Avoid planting these types of plants on the south or west sides of homes or near reflective surfaces.

Trees that will eventually reach 40-50 feet tall when mature don't belong in a 4-foot park strip. Keep in mind that as a general rule, the root system of trees can grow to more than 2 ½ times the canopy's width. When the root system is confined in an unnaturally small area, the trees cannot explore the soil and conduct enough water up to their leaves. This stresses the trees and often results in the leaves having scorched or burned margins. Select trees according to the size they will eventually become. Newer selections and cultivars are typically smaller than the species and fit better in most residential landscapes.

2- Proper Irrigation:

Turfgrass is probably the most abused plant out there when it comes to water. A change from a bright green to a dull blue color in turf is probably the best indicator to know that it is time to irrigate, (not according to the day of the week). Automated timers have made irrigation convenient for homeowners, but they also make it very easy to over-water. Over-watering can create an optimal environment for fungal diseases to become established and thrive--even in arid Utah. During July and August, Kentucky bluegrass, which constitutes the majority of Utah

lawns, needs between 1 ½ - 2” of water per week. Many homeowners water up to 50% in excess of that amount. The trick is to think in inches, not in minutes. By performing a simple water check of a sprinkling system, a homeowner can determine how much water the system is putting out. Homeowners are often surprised to find out how much water (and money) is actually being wasted. These water checks are as easy as 1-2-3.

- 1- Place a few deep (4-6”), straight edged containers out randomly across the lawn.
- 2- Turn on the system for at least 10 minutes.
- 3- Measure the water in the container. (This will let you know how much water is being applied for a given time).

A general recommendation often given is to water as deeply and as infrequently as possible. Every 3-4 days is optimal but much will be determined by the soil texture (sand, loam, clay) and sprinkling system. Deep and infrequent watering encourages the turfgrass roots to grow deep and become better adapted to withstand drought. Hand water dry areas instead of just adding more time to the stations.

3- Avoid Chemical Damage:

When temperatures are consistently above 85 degrees (Fahrenheit), broadleaf weed- killers (containing 2,4-D) should be avoided. These chemicals, if sprayed in the heat, change from a liquid to a vapor. This process is called volatilization. These vapors can move by means of air currents for long distances and can damage trees, shrubs and other desirable plants. Put broadleaf weed- killers away for the summer. In general, I recommend not using these chemicals between Memorial Day and Labor Day.

Soil sterilants are another class of chemicals that can cause unwanted damage. These products bind to the soil particles and remain active for up to a year (some longer). They are commonly used around power substations and railroad tracks to eliminate vegetation in order to prevent fire hazard. But for the homeowner, there is rarely a situation that requires the use of these products. Because these products adhere to the soil particles, they can move easily with water flow. There have been many non-target plants that have been damaged and/or killed because of the improper use of these products.

For fence lines, driveways and other areas where a weed-free zone is desired, better choices would include glyphosate products (Round-up, Killzall, Eraser). These chemicals are non-selective herbicides, meaning they will control most weeds. These products are considered safer to use because the active chemical quickly becomes metabolized or inactive when it comes in contact with the soil.

The labels of all chemicals are very specific with regard to instructions on safety and use. Keep in mind that the labels are legal documents. When homeowners buy chemicals such as these herbicides, they assume legal responsibility for their use and can be held liable for any damage.

For more information and help on how to have healthy landscape plants, log onto <http://extension.usu.edu> and click on County Offices to find a Horticulture Agent nearest you.

Rapid weather change confuses plants

By Larry A. Sagers

From: Deseret News: www.deseretnews.com archives

If the weather has you confused, think what it must be doing to your plants.

The cool, moist spring suddenly turned hot with a vengeance. In early June, plants thought that they had emigrated to Seattle, London or someplace besides our desert. Likewise, tomatoes, peppers and many warm-season flowers pouted as they waited for warmer temperatures to help them grow.

Of course, what happens in the garden is always weather-related. The trick is to determine what is happening and how it affects the plants. Is it a temporary problem or is it something that can have serious, life-threatening consequences for the plants?

Let's start in the vegetable garden to check what is going on there.

The delineation here is between warm-season and cool-season vegetables. Any cool-season crops (peas, carrots, beets, lettuce and other vegetables) that were planted early liked the spring and probably produced good crops, providing they germinated in the cool, moist soils.

Some of these crops don't like the heat. Temperatures in the 90s often cause them to bolt or flower and go to seed. Even if they don't bolt, they usually turn tough and bitter, and the quality drops to the point they're not worth eating. Cabbage heads often split.

Warm-season vegetables got off to a slow start. The first problem was getting the seed to germinate. Many warm-season crops will not germinate until soil temperatures reach 55 degrees, and many require soil temperatures of 75 degrees or more. That doesn't happen when temperatures repeatedly drop into the 40s at night.

After getting warm-season crops to germinate, they still might not be happy. If you purchased transplants, they might have been sitting in the soil without growing much for several weeks. Now that it is warmer, they are finally starting to grow and hopefully should start producing soon.

One problem I have already seen hitting the tomatoes is curly top. This is a virus disease spread by the sugar beet leafhopper. The symptoms show as curled leaves that roll or turn upside down. The leaves turn yellow and the veins on the underside of the leaves are purple. If there is fruit, it ripens at whatever size it happens to be. There is no cure.

When the plants start to bloom, you might find another problem. All tree fruits and vegetables that produce a fruit have to be pollinated. While tomatoes, corn, peas, beans and several other crops are pollinated by the wind, most require bees to help the process.

For your fruit trees, either the bees were there or they weren't, and it is too late to do anything about it now. The crops to watch are melons, squash, pumpkins and cucumbers. If you get blossoms but no fruit, you might do some hand pollinating by transferring pollen from the male blossoms to the female blossoms that have the little fruits attached.

Moving into the rest of the landscape, take a look at the trees. If you have London Plane or sycamore trees, they might be lacking their leaves. The culprit in this case is a fungus called sycamore anthracnose. The disease attacks the buds as they start to open. It then spreads into the wood. This causes the twigs to die and prevents leaf development.

Prevention is the key. Once the fungal diseases develop, it is too late to effectively control them. Fungicides are only effective if applied before the leaves unfold. Fortunately, these trees are resilient and will send out new, healthy leaves once the weather turns warm and dry.

Your aspen trees might show similar problems now — or even later — in the summer. Aspen leaf spot is another fungus that causes the leaves to develop dark spots that sometimes expand until they turn totally black. Any treatment after the spots appear is useless, so save your time and money.

Evergreen trees are making some homeowners nervous because as the new foliage emerges, the old needles look pretty rough. They survived drought and heat last year and look a little dry and discolored. Look at the new growth. If it is healthy and green, the trees are probably fine.

Lawns are a whole different matter. Those who were complaining about mushrooms growing in their lawn a few weeks ago are now complaining about huge brown areas appearing like alien landing spots. The majority of brown spots are the result of improper watering. Check your sprinkler system, and also check the water penetration to make certain the water is going into the soil.

Fortunately, while most of our plants were happy for the moisture and cool air, most are also adapting to the normal summer temperatures. Nature has a way of helping them compensate and thrive in spite of our complaints. So get out and enjoy growing your garden!

Larry A. Sagers is the horticulture specialist, Utah State University Extension at Thanksgiving Point.