

Chapter 15 - Ladders

Ladders pose a number of safety risks. You can fall from them, or ride them down when they fall or break. You can drop things from them onto people. You can contact live electrical lines, or they can fall from your vehicle into oncoming traffic.

Inspection

Inspect your ladder frequently, at least monthly. Ladders that are exposed to the weather should be inspected more often. Do not use a ladder that has developed defects. When inspecting a ladder look for:

- Loose hardware
- Metal burrs or sharp edges
- Loose or damaged rungs
- Rusted metal parts
- Cracked or missing nonskid feet
- Frayed or worn ropes (extension ladders)
- Splinters, wood rot, loose or split side rails (wood ladders)

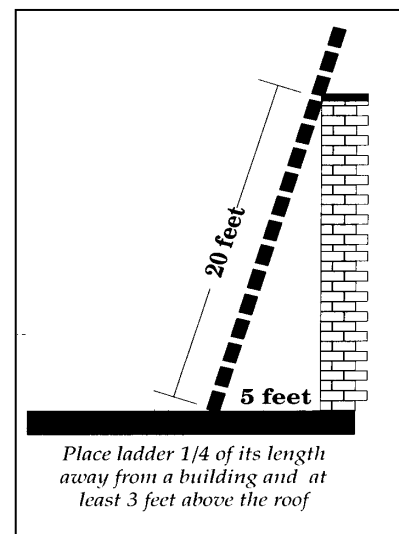
Step Ladders

Make sure that any step ladder that you use is equipped with a metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in an open position. Never stand on the top two steps of a step ladder.

Ladder Placement

Erect non-self-supporting ladders on a sound base with the base of the ladder a distance from the wall or upper support equal to one-quarter the length of the ladder. For example, if you are using a ladder that measures 20 feet from the ground to the point of support, the base of the ladder should be placed 5-feet ($\frac{1}{4}$ the length) away from the side of the building.

Make sure that the top of a ladder used to gain access to a roof extends at least 3-feet above the point of contact.



Chapter 15 - Ladders

Precautions When Using Ladders

- Place the ladder on a sound base on level ground.
- Use both hands on the side rails, not the rungs, to climb a ladder. Face the ladder when climbing.
- Do not carry tools or other items in your hands when going up or down a ladder. Use a tool belt, a bucket and rope, or a duffle bag to transport equipment. Place small tools on the shelf at the top of a step ladder, and then climb up or down the ladder.
- Never stand on the three top rungs of an extension ladder or the top two steps of a step ladder.
- Securely fasten a ladder when transporting it in an open vehicle.
- When carrying a ladder, avoid swinging it into people, objects, or traffic.
- Make sure your ladder has anti-slip safety feet.



WEEKLY TRAINING SESSION

Open Proposal Portal

At Massey Services, we are dedicated to fostering innovation and creativity in the development of safer, more efficient, and more effective technologies and methods.

To support our continuous progress, we are pleased to introduce the Open Proposal Portal—a digital platform that automatically follows up with prospective customers and offers a convenient option for online purchase of open proposals, accessible from anywhere. Once a proposal has been entered into the Lead Log, the platform initiates an automated follow-up email sequence to the customer. If the customer elects to complete a purchase, a sales notification email is automatically dispatched to the designated Service Center.

This training outlines the commission structure, available services, email notification procedures, and operational protocols that all General Managers and Office Managers are expected to adhere to upon receipt of a sale through the Open Proposal Portal.

Sales Inspector Commission Structure

All open proposal submissions through the portal are governed by standard commission procedures. The Sales Inspector (SI) responsible for initially delivering the proposal will receive full commission credit for any resulting open proposal sale, regardless of the timing or method by which the customer completes the purchase.

This commission procedure emphasizes the critical importance of promptly, accurately, and comprehensively recording every proposal in the Lead Log. The platform depends solely on Lead Log data to automatically deliver proposals to customers. Failure to document a proposal prevents the platform from following up on that opportunity, resulting in the forfeiture of potential commission for the associated Sales Inspector.

Additionally, General Managers are expected to oversee and hold their administrative team members accountable for the proper management of the Lead Log, ensuring adherence to this practice as part of standard operational procedures.

Services Available on the Open Proposal Portal

The following services are currently available for customers to purchase directly through the Open Proposal Portal:

- Pest Prevention
- Landscape / Lawn Care
- Irrigation
- Mosquito
- Termite program

Important: Fumigation is not available for purchase through the Open Proposal Portal and will not be included in any proposal links sent to customers after the initial inspection. Regional Managers will communicate as additional services become available through this process.



WEEKLY TRAINING SESSION

Open Proposal Portal

Service Center Email Receipt

Upon a customer completing a purchase via the Open Proposal Portal, the Service Center will automatically receive an email notification containing all relevant account and sales information. Two sample notifications are provided below — one for Pay-In-Advance (PIA) customers and one for Autopay customers.

Sample 1: Pay-In-Advance

New Open Proposal Sale Received

Good news! You have received a new open proposal sale for your service center. See the customer information below and use the link to navigate to ServicePro and enter the correct programs and events.

Customer Name: Juliette Nichols

Account Number: 9192256

Service Address: 369 NE 77th LN, Gainesville, FL 32609

Phone Number: (999) 999-9999

Email: jnichols@masseytest.com

Proposals Purchased: Pest Quarterly; Landscape Monthly

Payment Preference: PEST=Pay-In-Advance; LAND=Pay-In-Advance (Please process payment w/discount ASAP)

Start Date: 04/24/2026 @ 11:00AM – 1:00PM

Initial Payment: PEST=XXX.XX; LAND=XXX.XX

Annual Amount: PEST=XXX.XX; LAND=X,XXX.XX

Service Pro Link: [[Link to customer account](#)]

Admin will add the appropriate programs and events to the account in ServicePro, based off the details on the Sales Agreement associated with the purchase. Admin will assign the initial to the proper technician route based on territory assignment, and confirm the correct Sales Inspector is set as the Primary Sales Person within the account. Morning of initial, Admin will send new customer “Welcome to Massey” email, template in online sale procedure. Admin will create a customer file including copy of email received by SC, and a copy of acknowledgement of the offering. The Sales Inspector who made the original proposal will join the Technician for the initial service. Sales Inspector will graph the property and collect the customer signature. The Technician will greet the customer at the initial and proceed with our standard procedure.



WEEKLY TRAINING SESSION

Open Proposal Portal

Sample 2: Autopay

New Open Proposal Sale Received

Good news! You have received a new open proposal sale for your service center. See the customer information below and use the link to navigate to ServicePro and enter the correct programs and events.

Customer Name: Juliette Nichols
Account Number: 9192256
Service Address: 369 NE 77th LN, Gainesville, FL 32609
Phone Number: (999) 999-9999
Email: jnichols@masseytest.com
Proposals Purchased: Pest Quarterly; Landscape Monthly
Payment Preference: PEST=Autopay; LAND=Autopay
Start Date: 04/24/2026 @ 11:00AM – 1:00PM
Initial Payment: PEST=XXX.XX; LAND=XXX.XX
Annual Amount: PEST=XXX.XX; LAND=X,XXX.XX
Service Pro Link: [\[Link to customer account\]](#)

Admin will add the appropriate programs and events to the account in ServicePro, based off the details on the Sales Agreement associated with the purchase. Admin will assign the initial to the proper technician route based on territory assignment, and confirm the correct Sales Inspector is set as the Primary Sales Person within the account. Morning of initial, Admin will send new customer “Welcome to Massey” email, template in online sale procedure. Admin will create a customer file including copy of email received by SC, and a copy of acknowledgement of the offering. The Sales Inspector who made the original proposal will join the Technician for the initial service. Sales Inspector will graph the property and collect the customer signature. The Technician will greet the customer at the initial and proceed with our standard procedure.

Operational Procedures

The procedure to follow upon notification of an Open Proposal Portal Sale are as follows:

1. Upon receipt of the email notification the administrative team member will:
 - a. Review the email and the account which will automatically be set up in ServicePro (if the sale is for an existing customer, verify the account).
 - b. Retrieve the original proposed sales agreement and review to validate:
 - i. Service type
 - ii. Pricing
 - iii. Service frequency



WEEKLY TRAINING SESSION

Open Proposal Portal

- c. Enter the program and events into ServicePro on the newly created or existing account.
 - d. Assign the services to the appropriate technician/route scheduling the initial service for the indicated date and time in the email.
2. On the morning of the initial service, the administrative team will send a Welcome to Massey / Service Confirmation email to the customer (see email template below, noting all areas highlighted will be changed based on the customer and service type). This email will contain:
 - a. A warm welcome statement thanking the customer for choosing Massey Services.
 - b. Confirmation of the scheduled service with the date and time.
 - c. The technicians name who will be servicing the property that day.
 - d. An additional thank you for choosing Massey Services.

Welcome to Massey / Service Confirmation Email Template

Email Subject Line: Confirmed Appointment with Massey Services

Thank you for choosing Massey Services – we look forward to serving you!

Your upcoming appointment is scheduled for:

Friday, January 24, 2026, at 11:00am

Our Massey Services Team Member, **NAME**, will arrive in a company vehicle and will be wearing a licensed Massey Services badge.

Your initial service will take approximately **60-90 minutes** (Pest or Termite) **30 minutes** (Lawn/Landscape). Please keep in mind that if this is a Pest Prevention or Termite Protection service, we will need access inside your home for a thorough inspection.

After your initial treatment, we will be back for your first (**quarterly, bi-monthly, or monthly**) service the following month. Your ongoing service will include proactive, seasonal treatments as well as recommendations to prevent future issues.

As a reminder, all our services are backed by our no-nonsense, money-back guarantee. If you ever have an issue between scheduled services, please contact us immediately and we'll come back at no additional cost to you.

If you have any questions or need to reschedule your appointment, please contact our Customer Care team at 1-888-2MASSEY (262-7739) or WeCare@MasseyServices.com.



WEEKLY TRAINING SESSION

Open Proposal Portal

3. Sales Inspectors (GM if SI is unavailable) will be responsible to meet the technician on-site at the initial service to obtain the following:
 - a. Signed Graph
 - b. Graphical Analysis
 - c. Consumer Notice Form
4. The administrative team will create a customer file to include:
 - a. A copy of the Open Proposal Portal email notification
 - b. The original agreement that was proposed
 - c. Termite programs will require a signed copy of the Consumer Notice Form and graphical analysis
 - d. The new signed graph
5. Service Managers will review the initial service with the technician as part the daily check-in.

The Ghost Ant, *Tapinoma melanocephalum* (Fabricius)

[Some excerpts are taken from the UF IFAS Featured Creatures article]

The ghost ant was considered a nuisance ant that was occasionally important as a house pest within Florida as late as 1988. Field populations were confined to South Florida although active colonies had been reported as far north as Gainesville, in Alachua County and Duval County. But by 1995, if not before, the ghost ant was common in central and southern Florida and had been elevated to major pest status. In more northerly states, infestations are confined to greenhouses or other buildings that provide conditions necessary for survival, as the ant is a tropical species either of African or Oriental origin. However, this introduced ant species is so widely distributed by commerce that it is impossible to determine its original home.



Ghost Ant Worker

Distribution

The ghost ant is associated with a complex of ant species known as "tramp ants" that is widely distributed in tropical and subtropical latitudes worldwide. In fact, *T. melanocephalum* was once referred to simply as the "tramp ant." Colonies of *T. melanocephalum* have even been reported from the Galapagos Islands. Ghost ant populations and infestations are reported in many areas of the United States, as well as in Canada, Puerto Rico and the Caribbean Islands.

In the United States, the ghost ant is well established in Florida and Hawaii, and its range is expanding. The ant reached Texas in 1994 or 1995, probably through Galveston on a shipment of plants from Florida. In the northern states, it can only survive in greenhouses and other heated environments.

In Florida, the ghost ant is mostly found from Sarasota to Orlando and south, although it does occur as far north as Gainesville in Alachua County and Duval County.

A survey conducted with Florida structural pest control employees to determine the kinds of ants and types of ant problems confronted in both commercial and household pest control revealed that the ghost ant was one of the top 8 pest ant species.

Description

Ghost ant workers are extremely small, 1.3 to 1.5 mm long and monomorphic (one-sized). They have 12-segmented antennae with the segments gradually thickening towards the tip. Head and thorax are a deep dark brown with abdomen and legs opaque or milky white (Creighton 1950). The thorax is spineless.



Ghost ant worker.

The gaster (swollen part of abdomen) has a slit-like anal opening which is hairless. The abdominal pedicel (stalk-like structure immediately anterior to the gaster) consists of one segment which is usually hidden from view dorsally by the gaster. Stingers are absent.

The small size, combined with the pale color, make ghost ant workers hard to see.

Biology and Behavior

The ghost ant is highly adaptable in its nesting habits. It nests readily outdoors or indoors. Colonies may be moderate to large in size containing numerous reproducing females (polygyny). Generally, the colonies occupy local sites that are too small or unstable to support entire colonies. The sites include tufts of dead but temporarily moist grass, plant stems, and cavities beneath dead vegetation in open, rapidly changing habitats. Indoors, the ant colonizes wall voids or spaces between cabinetry and baseboards. It will also nest in potted plants. Thus, the colonies are broken into subunits that occupy different nest sites and exchange individuals back and forth along odor trails. Ghost ants are opportunistic nesters in places that sometimes remain habitable for only a few days or weeks.

Multiple queens may be spread out in multiple subcolonies. Usually nesting occurs in disturbed areas, in flowerpots, under objects on the ground, under loose bark and at the bases of palm fronds. Indoors, the ant nests in small spaces such as cracks, spaces between books, or wall voids. Indoor foragers often come from outside. This is a very common pest inside homes.

New colonies are probably formed by budding. This occurs when one or more reproductive females, accompanied by several workers and possibly some brood (larvae and pupae) leave an established

colony for a new nesting site. There does not appear to be any infighting between members of different colonies or nests.

The nesting habits of the ghost ant are similar to that of the pharaoh ant, *Monomorium pharaonis*.

Workers have the habit of running rapidly and erratically when disturbed. They are fond of honeydew and tend honeydew-excreting insects. They also feed on both dead and live insects. When workers are found trailing, their movement is more slow and deliberate. On close inspection some trailing workers can be seen carrying brood (larvae and pupae). They will enter structures from nests near foundations or from plants that contact the building.

In Costa Rica, jumping spiders (Araneae: Salticidae) were found living within nests of *T. melanocephalum* located on the undersides of leaves. The basis of this relationship appears to be symbiotic. The spiders provide the ants with protection from predators and parasites, while the ant nest is used as a foundation for web construction.

Economic Importance

This species is a household pest. In Florida, it is considered one of the most important pest ants. The ghost ant can not only invade houses from outside, but they can nest in the house as well. Although the ant feeds upon many household foods, it seems to show a preference for sweets, having been observed feeding on sugar, cakes, and syrups. Outside, the workers scavenge for dead insects and tend sap-sucking insects, collecting honeydew.

In Florida, the ghost ant has infested quarantine greenhouses where they have proven impossible to control due to the restrictions imposed on the use of toxicants in these greenhouses. In Gainesville, the ant preyed upon small developing insect larvae from the cultures of insects in quarantine. In more northern areas, it has become established in heated greenhouses where it can become a problem, especially if it defends honeydew producing, plant pests against introduced biological control organisms.

In coastal Venezuela, the ghost ant was found to be the primary predator of the eggs of *Rhodnius prolixus*, the vector of Chagas' disease. This effective predaceous activity on *R. prolixus* populations by *T. melanocephalum* may account for the absence of *R. prolixus* associated diseases from this area of Venezuela.

Detection

The ant is easily recognized due to its peculiar color markings and small size. Foragers are seen in kitchens and bathrooms on sinks, counters, and floors. When crushed, the workers emit an odor similar to that of rotten coconuts.

The ghost ant is in the same genus as the odorous house ant, *Tapinoma sessile* (Say). However, the odorous house ant is entirely dark brown to black.

The Pharaoh ant is also similar to this species but the ghost ant only has one node on its pedicel compared to two on the pedicel of the Pharaoh ant. Other bi-colored, one-node ants either tend to be much larger or the node on the pedicel is visible from above.

Management

The best approach to ant control in the home is cleanliness. Any type of food or food particles can attract and provide food for ants. Store food in tight containers. Remove plants that can attract ants or else control aphids, whiteflies and other insects that produce honeydew on the plants. Reduce moisture sources, including condensation and leaks.

If possible, follow the trails of this species back to the nest and treat the nest. If treating the trails with bait check within one or two days to see if the ants are feeding. If not, relocate the bait. Indoor colonies nesting within voids can be controlled with baits. Access of foragers entering from outdoors through cracks and crevices or screens should be restricted with barrier sprays.

Generally, control is not necessary except where it becomes a nuisance in the home or in greenhouses. If control is necessary, the ant is susceptible to a number of baits and residuals.

Ghost ants continue to expand their range during warm weather. In Florida, that means NORTH! Typically, Ocala, Gainesville and Jacksonville have an occasional indoor infestation, but in warmer months the number of extra services for ghost ants in these areas may increase. Last year we had a warm winter and this year may prove to be the same. Hurricanes also disorient natural outdoor colonies. In the spring there is always new activity from disoriented colonies. Because of their small size, ghost ants continue to be the number one indoor pest ant statewide.

We predict an increase in the number of ghost ant extra services for the following reasons:



Milder winters this year and last



Roofs with gutters that accumulate leaf litter will always be a prime nesting area, leading to regular indoor invasions.



Small size allows them to “bridge the gap across a barrier treatment” from the garden to a minute crack into the home



We are seeing a trend towards more and larger multiple queen colonies



Customers tend to spray indoors to quickly kill trails, causing the ants to bud



The ants tend to disperse across the most commonly used countertop areas especially in the kitchen and bathrooms, coming out of the tiniest of gaps in window sill, shower, and sink areas. This bothers customers more than an occasional roach

For these reasons we must review the attached article about ghost ants that discusses their biology. Armed with information about the ants, Technicians need to follow these steps to prevent ghost ant extra services:



OUTDOORS: To prevent ants from threatening the home, always look closely around the perimeter of the home. During your inspection look for:

1. Leaf litter in gutters or on roofs. Clean out the litter or recommend it be cleaned out.
2. Plants touching the side, eaves, or roof. Prune away all branches or recommend they be pruned.
3. Scale, aphid or honeydew producing insects on plants that may attract ants. Recommend GreenUP or having these pests treated. The Technician can legally treat these plants if ants are crawling on them, thus killing the ants AND the honeydew producers. Likewise, GreenUP Technicians and Inspectors who see these ants at a GreenUP customer's home need to try and cross-sell Pest Prevention.
4. Potted or hanging potted plants. Move pots and lightly agitate some of the upper dirt to check for ant activity. Treat with appropriate



- products per the Rotation Schedule. Remember that Borid dust will kill plants!
5. Debris in the garden and/or dead plant material and stumps. Move these materials and probe into dead material to investigate.
 6. Pet food and children's play areas. Often food and residue on toys can attract the ants.
 7. Areas where the ants have been active in the past. Why? Because their pheromone trails last for weeks and they can suddenly return using the very same trails to where food or harborage once was.
 8. Garbage cans, water faucets and air conditioning units. These are all associated with food or water...ants love to breed close to food and water.
 9. Active ants located outside off or on the home. If found, use a non-repellent residual barrier along with bait that attracts them on the spot.

Quick glances around the perimeter of the home while brushing away webs is NOT an effective ghost ant inspection method. The above areas need to be closely examined, especially at accounts with a history of ghost ants. Prebaiting outdoors with mint jelly on the ground below each window is a better way of rapidly attracting these ants that are often difficult to locate.



INDOORS: When indoor activity is found:

1. Make sure that your outdoor search is thorough and that treatment outside has been accomplished.
2. Locate exact spots where the ants are entering the home.
 - a) If there is only one minor entry point **and** you have baited and treated outdoors on the opposite side of this entry point, you can simply wipe up the trailing ants inside and caulk the gap inside with clear (or white caulk if the grout is white). Usually this requires an extremely small amount of caulk. The ants should go to the bait outside and take it to the queen(s) if any within the wall and all should disappear.
 - b) If there are multiple entry points this can also be done as long as outdoor foragers are on the home.
 - c) If there are entry points that do not seem to connect to the outside and/or ants seem to be coming out of wall voids and there is no activity outside, then small dabs of bait at the back sides of the countertop or window base close to the entry points and right along the trail.
 - d) The bait should be Optigard Ant Gel the first time. Advion Ant Gel, Maxforce Quantum and Terro 1% bait are also good if after a quick dab they are attracted. NOTE: Termidor can **only** be used for spot treatment of ants **outdoors!** Apply Phantom indoors within



cracks and crevices from which the ants enter the home. When this is done, always explain to the customer AND write in the recommendations on the Service Report (also for peer communication) not to spray any ants for a few days...just let them feed on the bait.

3. Do not dust electrical outlets as these ants bud like pharaoh ants!
4. Make sure the customer keeps crumbs and food cleaned up.
5. Always give the customer a Fast Facts handout on Ghost Ants! Review the Fast Facts with customers in ghost ant neighborhoods regularly!
6. Always follow up in 3-4 days following active ghost ant activity. Activity should be greatly diminished or completely ceased by the fourth day if every colony was located and/or baited.

If after one Technician service for ghost ants, one with the Service Manager, and a third with the General Manager, then Technical Director should be contacted for guidance. In almost every case one of the above listed conducive conditions was not located or the treatment was not performed per protocol (i.e. dusting of wall voids).

Name _____ Date _____

Pre & Post Tests

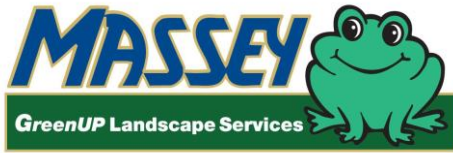
1. The best product to use for ghost ant control is:
 - a) Terro 1%
 - b) Maxforce Quantum
 - c) Optiguard
 - d) Any bait that will attract numerous workers
2. Phantom can be used to control ghost ants:
 - a) Where? _____
 - b) How do you apply it? _____
 - c) What do you tell customers following indoor treatments for ghost ants? _____.
3. From these choices, the best area to use dust on ghost ants would be:
 - a) in a potted plant
 - b) in all the electrical outlets
 - c) when you find a large colony within structural cracks under loose roof shingles by the gutter
 - d) all of the above
4. Why should you inspect an area of the home that once had ghost ant activity over a month ago but no longer has active ants? _____
5. What should you be looking for on plants in the garden surrounding the home?

6. List 4 contributing factors to the recent increase in ghost ant activity statewide:
 - _____
 - _____
 - _____
 - _____
7. List 4 products we use to control ghost ants:
 - _____
 - _____
 - _____
 - _____



Answer Key to Pre & Post Tests

1. The best product to use for ghost ant control is:
 - a) Terro 1%
 - b) Maxforce Quantum
 - c) Optiguard
 - d) **Any bait that will attract numerous workers 1point**
2. Phantom can be used to control ghost ants:
 - a) Where? **Indoors 1 point**
 - b) How do you apply it? **crack & crevice only around ant activity 1 point**
 - c) What do you tell customers following indoor treatments for ghost ants? **Do not spray on the ants and let them take the bait to the queens. 1point**
3. From these choices, the best area to use dust on ghost ants would be:
 - a) in a potted plant
 - b) in all the electrical outlets
 - c) **when you find a large colony within structural cracks under loose roof shingles by the gutter 1 point**
 - d) all of the above
4. Why should you inspect an area of the home that once had ghost ant activity over a month ago but no longer has active ants? **they can relocate and use the same old pheromone trails they had in the past 1 point**
5. What should you be looking for on plants in the garden surrounding the home? **trailing ghost ants AND honeysuckle producing plant feeding insects that will attract the ants 2 points**
6. List 4 contributing factors to the recent increase in ghost ant activity statewide: **4 points**
Any of the following: **Warmer weather, hurricanes, small size, multiple queens, customers spray the ants which will cause them to bud**
7. List 4 products we use to control ghost ants: **4 points**
Any of the following: Optigard, Borid/Drione, Termidor, Uncle Albert's, Phantom, Terro II, Gourmet Ant Gel, Demand, Talstar liquid or granules. (16 total points. Suggest retaking posttest if over 3 points missed)



WEEKLY TRAINING SESSION



Gray Leaf Spot

Topic Category: Lawn

Recordable Verifiable Training Hours: 1

Objectives: This lesson is designed to teach the basic biology and management of gray leaf spot.

Length of lesson: Approx 60 minutes.

Materials needed:

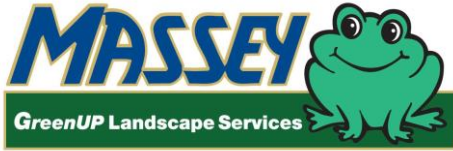
- Training outline
- Gray leaf spot Protocol (G: Drive\Shared\GreenUP Reference Materials\GreenUp Protocols\Individual Protocols\Lawn Damaging Diseases)
- Samples from the field, if available
 - If samples of the disease are not available, color photos can be used.
- Pre and Post tests

Training Guidelines:

- This training qualifies for Department of Agriculture ID Card Holder Training. Complete a Department of Agriculture ID Card Holder Training for each Team Member and maintain it in their personnel file at your office.

Make copies of the tests and training material for all Team Members attending.

- Set up the training area in an area of the office that will minimize disruptions.
- Begin the meeting by defining the training topic and handing out the pre-test
 - Allow a few minutes for all Team Members to complete the pre-test.
 - Collect the pre-test and hand out the Verifiable Training Record form.
- Distribute and review the training materials on gray leaf spot. Use the Training outline as a guide for key points.
 - Encourage active participation from all Team Members
 - Ask probing questions to develop key points
 - Encourage group reading
- After reading and reviewing the materials in the lesson, ask questions to verify the material has been understood.
- Hand out the post-tests. When complete, grade the tests and record the score on the Verifiable Training Record form.
- Collect tests and place with the verifiable materials in the Service Center Verifiable Training File.
- Make copies of the Verifiable Training Record and place in each Team Member's personal training file.
- Complete all Weekly Training through Massey University.



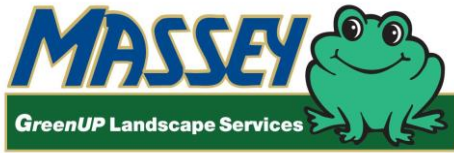
WEEKLY TRAINING SESSION



Gray Leaf Spot

Training Outline

1. Review the protocol for gray leaf spot. Point out the key items including:
 - Description of the disease. Pass around samples or pictures to help in identification of the disease.
 - Host plants
 - Typical symptoms (how to ID this problem)
 - Conducive conditions
 - Control measures
 - Disease triangle and breaking the cycle by removing one of the three components
 - The importance of cultural control
 - Explain proper chemical control



WEEKLY TRAINING SESSION

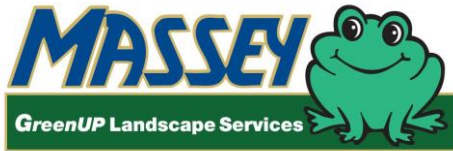


Gray Leaf Spot

Name _____ Date _____

Pre/ Post Test

1. What time of year is gray leaf spot most active?
 - a. Early spring
 - b. Summer
 - c. Fall
 - d. Winter
2. Symptoms of Gray Leaf Spot appear as...
 - a. blue gray areas
 - b. leaf spots on the grass blades in fist size patterns
 - c. circular to oblong leaf spots that are tan to brown in color with distinctive brown margins
3. T or F Temperatures in the mid 80's to low 90's, high humidity and summer rains will favor the development of gray leaf spot.
4. T or F Gray leaf spot is a common problem in areas of previous drought damage.
5. T or F Gray leaf spot symptoms can literally appear over night.
6. T or F High rates of quick release nitrogen will discourage the spread of gray leaf spot.
7. T or F The fungicide we use to control gray leaf spot is Affirm.
8. T or F This fungicide is applied using the backpack sprayer and the 11010 spray tip.



WEEKLY TRAINING SESSION



Gray Leaf Spot

Answer Key

Pre/ Post Test

1. What time of year is gray leaf spot most active?
 - a. Early spring
 - ☒ b. Summer
 - c. Fall
 - d. Winter
2. Symptoms of Gray Leaf Spot appear as...
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8. T or ☒ F This fungicide is applied using the backpack sprayer and the 11010 spray tip.



GREENUP LAWN, TREE & SHRUB CARE SERVICE PROTOCOLS

Gray Leaf Spot Fungus

In the summer, there are many fungal pathogens that will attack turf grass blades. Warm temperatures, ample rainfall and actively growing turf during this time of year meet all of the requirements for a disease to flourish. One of the more common diseases we see in the Southern U.S. is gray leaf spot.

GRAY LEAF SPOT

Gray leaf spot is one of the more common fungal pathogens of St. Augustine grass. It is observed from late spring to early fall and is most frequently seen during periods of warm weather, high humidity and heavy rainfall. You will find a slight infection in almost every St. Augustine lawn in Florida during the summer months, but rarely is severe damage observed (Figure 1).



Figure 1.

Pathogen

The fungus *Pyricularia grisea* is responsible for gray leaf spot. It was first reported in 1971 and is found throughout Florida and Southern GA. Other host grasses include annual and perennial ryegrasses as well as tall fescue.



GREENUP LAWN, TREE & SHRUB CARE SERVICE PROTOCOLS

Gray Leaf Spot Fungus

Symptoms

Initial symptoms include the development of small, pinhead size spots that are olive-green to brown in color (Figure 2). These spots enlarge to form circular to oblong areas that are tan to brown in color with distinctive brown margins. The discolored area may become covered in spores, giving the spots a “felted” gray appearance (hence the name gray leaf spot).

A single leaf blade may have many spots, causing dieback of the leaf tips. This will cause the blade to wither and turn brown (middle blade in Figure 2). Severe infections can cause death of the plant resulting in “melted out” patches throughout a lawn.



Figure 2.

Conducive Conditions

Typical summertime conditions are required for the disease to thrive and spread. Environmental factors that favor infection include:

- Temperatures in the mid 80s to low 90s
- High humidity >80%
- Prolonged leaf wetness (3 hours or more).
 - *Research has shown that at higher temperatures (>90°) the pathogen needs only 1 hour of leaf wetness to infect the plant.*

Turf is most susceptible to gray leaf spot when it is stressed or lacks dense cover. Common areas to find gray leaf spot are:

- Drought stress
- Herbicide injury
- Newly plugged areas

The fungus can produce a large amount of spores in a very short time (up to several million spores in just a couple days). As a result, symptoms can spread suddenly once conditions become conducive. It is not uncommon for this disease to literally appear “overnight”.



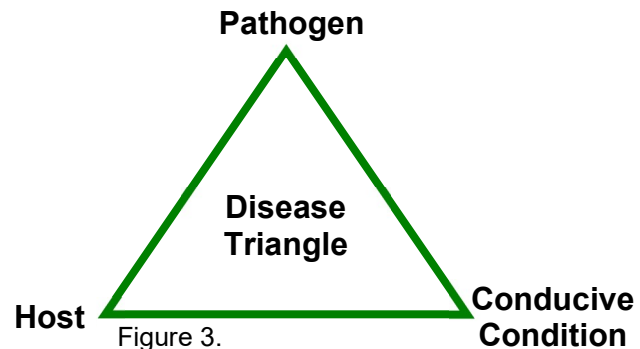
GREENUP LAWN, TREE & SHRUB CARE SERVICE PROTOCOLS

Gray Leaf Spot Fungus

Control

Once the disease has infected the plant, control is required. To control this disease, refer to the Disease Triangle (Figure 3). In order for a disease to thrive and reproduce, it needs three things:

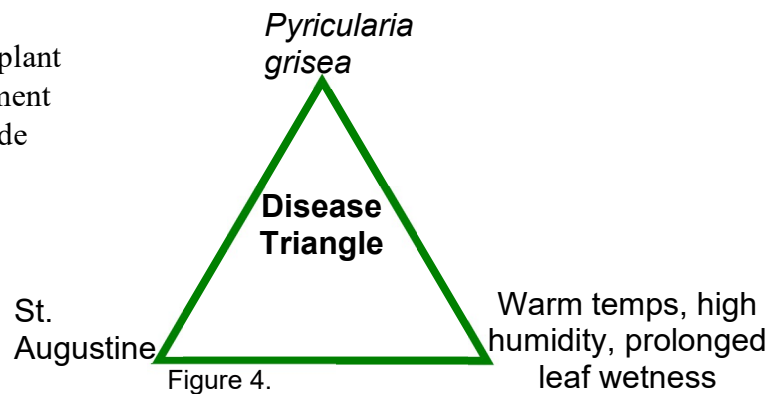
- The Pathogen
- The Host
- The Conducive condition



The removal of any one of these three factors will result in the control of the disease. The Disease Triangle for gray leaf spot is represented by Figure 4.

Control can be achieved by:

- Replacing with another plant
- Changes in the environment
- Application of a fungicide



Cultural methods are always preferred for disease control. The cultural control methods for gray leaf spot include:

- Limit nitrogen applications. High rates of quick release nitrogen predispose turf to infection. If nitrogen fertility is required, apply slow release or very low levels of quick release nitrogen.



GREENUP LAWN, TREE & SHRUB CARE SERVICE PROTOCOLS

Gray Leaf Spot Fungus

- Avoid drought injury by ensuring proper irrigation coverage during the dryer spring months.
- Avoid prolonged leaf wetness. This may be difficult during the rainy season, but educate your customers to not water in the evening as this will provide the conducive conditions even when the rain does not.
- Alleviate compacted soils by aerating. Compacted soils weaken the turf making it more susceptible to disease infestation.
- Avoid walking or mowing infected areas. The spores can be easily spread on the soles of shoes and mower blades. Walk through an infected area only if making a disease treatment.

When the severity of the problem warrants a fungicide application, spot treat using Transom. The application rate for Transom is 3 ounces per 1000 sq. ft. This amount of material is used for each gallon of water in the back-pack applicator using the 8010E spray tip. One gallon should cover 600 sq. ft. Multiple applications may be required during periods of favorable conducive conditions. After a fungicide application is made, the disease will temporarily stop spreading and the turf will begin to recover.



Tuliptree Scale

Topic Category: Lawn

Recordable Verifiable Training Hours: 0.5

Objectives: This lesson is designed to teach our Specialists and Inspectors about Tuliptree Scale.

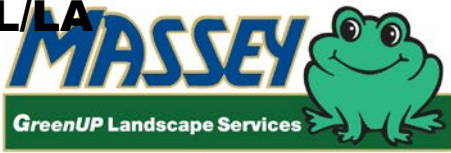
Length of lesson: Approx 30 minutes.

Materials needed:

- Training Guideline
- Tuliptree Scale Protocol G:\Shared\GreenUp Reference Materials\GreenUp Protocols\Individual Protocols\Tree Care
- Pre- and Post- tests.

Training Guidelines:

- Make copies of the tests and Tuliptree Scale Protocol for all Team Members attending.
- Set up the training area in an area of the office that will minimize disruptions.
- Begin the meeting by defining the training topic and handing out the Pre-test
 - Allow a few minutes for Team Members to complete the Pre-test.
 - Collect the pre-test and hand out the Verifiable Training Record Form (VTRF)
- Distribute and review the information on Tuliptree Scale.
- Use the Training outline as a guide for key points.
 - Encourage active participation from all Team Members
 - Ask probing questions to develop key points
 - Encourage group reading
- After reading and reviewing all materials, ask questions to verify the lesson has been understood.
- Hand out the Post-tests. When complete, grade the tests and record the score on the VTRF.
- Collect tests and place with the verifiable materials in the Service Center Verifiable Training File.
- Make copies of the VTRF and place in each Team Member's training file.
- Complete all Weekly Training through Massey University.



Tuliptree Scale

Name _____ Date _____

PRE & POST TEST

1. T or F Tuliptree Scale is only found on Tuliptrees.
2. T or F Tuliptree Scale is one of the smallest scales in the U.S.
3. T or F Each adult female Tuliptree Scale will produce as many as 3000 crawlers.
4. T or F The adult male Tuliptree Scale looks like a tiny wasp.
5. T or F Tuliptree crawlers can be spread on the feathers of birds.
6. T or F Large numbers of these scales can give an infested twig a warty appearance.
7. T or F Infestation of this scale can be so prolific that it can cover infested twigs and branches.
8. T or F Feeding from Tuliptree scale can cause death to a Magnolia tree.
9. T or F Control of Tuliptree scale in large trees can be accomplished with a spray of our Shrub I&D Slurry.

Tuliptree Scale**PRE & POST TEST ANSWER KEY**

1. T or **F** Tuliptree Scale is only found on Tulip trees.
2. T or **F** Tuliptree Scale is one of the smallest scales in the U.S.
3. **T** or F Each adult female Tuliptree Scale will produce as many as 3000 crawlers.
4. **T** or F The adult male Tuliptree Scale looks like a tiny wasp.
5. **T** or F Tuliptree crawlers can be spread on the feathers of birds.
6. **T** or F Large numbers of these scale can give an infested twig a warty appearance.
7. **T** or F Infestation of this scale can be so prolific that it can cover infested twigs and branches.
8. **T** or F Feeding from Tuliptree scale can cause death to a Magnolia tree.
9. T or **F** Control of Tuliptree scale in large trees can be accomplished with a spray of our Shrub I&D Slurry.

Tuliptree Scale

Tuliptree Scale

Toumeyella liriodendri (Gmelin)

Identification:

Tuliptree Scale is one of the largest soft scales in the U.S. Mature females grow to over 1/4th inch in diameter. They are oval, convex, and have a distinct flange around the margin of its protective waxy cover. The waxy covering of a mature female varies from light grayish green to pinkish orange mottled with black. The body fluid of a live female is also pinkish orange. Adult males are small and only have one pair of wings. Adult males may look like tiny wasp parasitoids as they crawl across the surfaces of an infested plant. The crawler stage is dark red and about 0.5 mm long.



Biology:

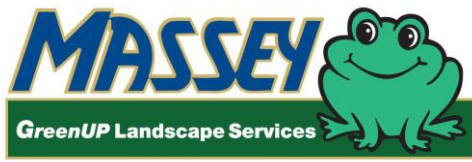
This pest overwinters as second instar nymphs and resumes feeding in early spring. Males emerge from the waxy scale covering as small, two winged individuals. They mate with the females and die. By summer, mature females give birth to first instar nymphs (crawlers). Each female may produce as many as 3,000 crawlers over several weeks. Crawlers are capable of moving around in a tree. They may be spread to new host trees by wind or on the feathers of birds. Once the crawlers find a favorable site, they insert their piercing-sucking mouthparts into the vascular system of the tree and begin to feed.

Damage:

Large numbers of these soft scales may give an infested twig a warty appearance. One of the first indications of an infestation of this pest is the abundance of honeydew and sooty mold. Ants seeking the honeydew are often found. The ants may also need to be managed since they will not only protect and farm the scale for honeydew, but because they will invade and nest in structures. Feeding by this pest will weaken trees by removing the plant fluid. In many instances this scale will be so prolific that it covers all of the twigs and branches. Feeding from a heavy infestation can result in a rapid decline and even death of large established trees. Magnolias have been the most commonly infested trees in our service area.

Control: This scale will require aggressive treatment and follow-up for control. Small trees can be sprayed with our I&D Slurry plus Horticultural Oil. A drench of the root system will be required; follow-up to reapply the spray in 10 to 14 days. Mid-Sized (under 6 inches in diameter at chest height) non-fruit bearing trees can be drenched with Imidacloprid using our Imidacloprid Mid-Sized Tree Drench Protocol. This treatment will work best when applied in the early spring. Large trees (6 inches and greater in diameter at chest height) can be treated with the Arborjet system using Ima-jet.

Host list: Magnolia, Yellow Poplar and Tuliptrees.



WEEKLY TRAINING SESSION



Soil pH

Topic Category: Lawn

Recordable Verifiable Training Hours: 1.0 hours

Objectives: This lesson is designed to teach the basics of pH, its effects and sampling.

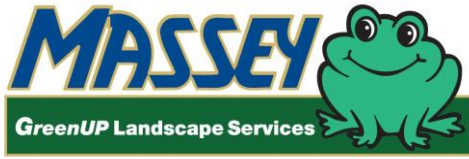
Length of lesson: Approx 1 hour.

Materials needed:

- Training Outline
- GreenUP Protocol “pH” G: Drive\Shared\GreenUp Reference Materials\GreenUp Protocols\Individual Protocols\Lawn Care Basic Application
- Soil probe(s)
- Hellige-Truog pH test kit
- Cardy twin pH meter
- Distilled water (NOT tap water)
- A can of Coke or other carbonated soda
- Plastic bags
- Disposable cups
- Pre- and Post- tests

Training Guidelines:

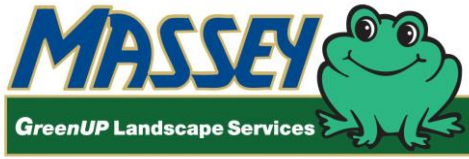
- Make copies of the tests and training materials for all Team Members attending.
- Set up the training area in an area of the office that will minimize disruptions.
- Begin the meeting by defining the training topic and handing out the Pre-test
 - Allow a few minutes for Team members to complete the pre-test.
 - Collect the pre-test and hand out the Verifiable training form
- Distribute and review the training materials on pH. Use the Training Outline as a guide for key points.
 - Encourage active participation from all Team Members
 - Ask probing questions to develop key points
 - Encourage group reading
- After reading and reviewing all materials, ask questions to verify the lesson has been understood.
 - Collect the pre-test and discard.
- Hand out the Post-tests. When complete, have each Specialist pass their test to another Specialist for grading.
- Grade the tests as a group and discuss the answers.
- Collect the tests
- End the training session.
- Record the post-test scores on the VTRF for each Team Member.
- Place with the verifiable materials in the Service Center Verifiable Training File.
- Make copies of the VTRF and place in each Team Member’s training file.
- Complete all Weekly VTM’s through Massey University.



Soil pH

Training Outline

1. Review the pH protocol.
 - a. Impress on the Team Members the importance of sampling the soil at the time of sale, at every annual aeration and whenever there is a problem.
 - b. Emphasize the role pH plays in achieving proper results from our nutritional applications.
 - c. Emphasize the need to pull samples from both affected and non-affected areas, but not to blend these samples together.
2. Demonstrate how to perform a pH soil test using the Hellige-Truog pH test kit and the digital pH tester.
 - a. Have each Team Member collect a soil sample from the training location. Encourage samples to be taken from different areas.
 - b. Write down the location of each sample and the condition and appearance of the plants of each sample site.
 - c. Test the samples using the Hellige-Truog pH test kit.
 - d. Test the samples using the digital pH tester.
 - i. In disposable cups, have the Team Members mix their soil samples with distilled water.
 1. The samples should consist of two parts water to one part soil.
 2. Only distilled water should be used: tap water interferes with the pH reading.
 - ii. Demonstrate how to calibrate the pH meter. Instructions are enclosed with each meter. Read the directions.
 - iii. Perform the test for each sample, making sure to clean the probe after each test as per the directions.
 - iv. Write down the results of each reading.
 - v. As a comparison, take the pH of a carbonated soda.
3. Discuss the results as they pertain to the conditions found.
 - a. If the conditions are consistent with the soil pH, explain how to correct the condition.
 - b. If the conditions are not consistent with pH, explain what other factors could be responsible for causing the condition. Reinforce the importance of always pulling a soil sample as all potential causes need to be reviewed.



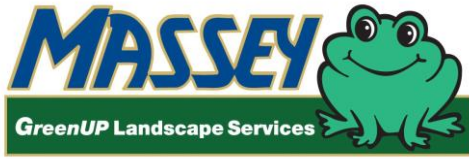
WEEKLY TRAINING SESSION



Soil pH

Pre & Post Test

1. T or F Soil pH is the measure of the acidity or alkalinity of a soil.
2. T or F A soil probe is used to collect soil samples.
3. T or F The Hellige-Truog pH test kit is used by all Inspectors at the time of sale to measure the soil pH.
4. T or F Tap water is used when running a soil sample using the digital pH meter?
5. If the pH needs to be raised, what material should be applied?
 - a. Sulfur
 - b. Lime
6. If the pH needs to be lowered, what material should be used?
 - a. Sulfur
 - b. Lime
7. It would be expected that a Bermudagrass lawn with a soil pH of 4.5 would appear as
 - a. Thin and dark-green
 - b. Thin and yellow
 - c. Thick and green
 - d. Thick and yellow
8. When should a soil sample should be taken?
 - a. At the time of sale
 - b. Annually with the aeration
 - c. When there is a problem
 - d. All of the above
9. What would need to be applied to adjust a soil pH of 4.5 into proper range for a Zoysia lawn?
 - a. Nothing would be needed.
 - b. 2.5 pounds of Ammonium Sulfate per 1000 sq. ft.
 - c. 25 pounds of lime per 1000 sq. ft.
 - d. 50 pounds of lime per 1000 sq. ft.
10. What would need to be applied to adjust a soil pH of 6.0 into proper range for a Bermudagrass lawn?
 - a. Nothing would be needed.
 - b. 2.5 pounds of Ammonium Sulfate per 1000 sq. ft.
 - c. 25 pounds of lime per 1000 sq. ft.
 - d. 50 pounds of lime per 1000 sq. ft.



WEEKLY TRAINING SESSION



Soil pH

Pre & Post Test Answer Key

1. ☒ T or F Soil pH is the measure of the acidity or alkalinity of a soil.
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GREENUP SERVICE PROTOCOLS

Soil pH

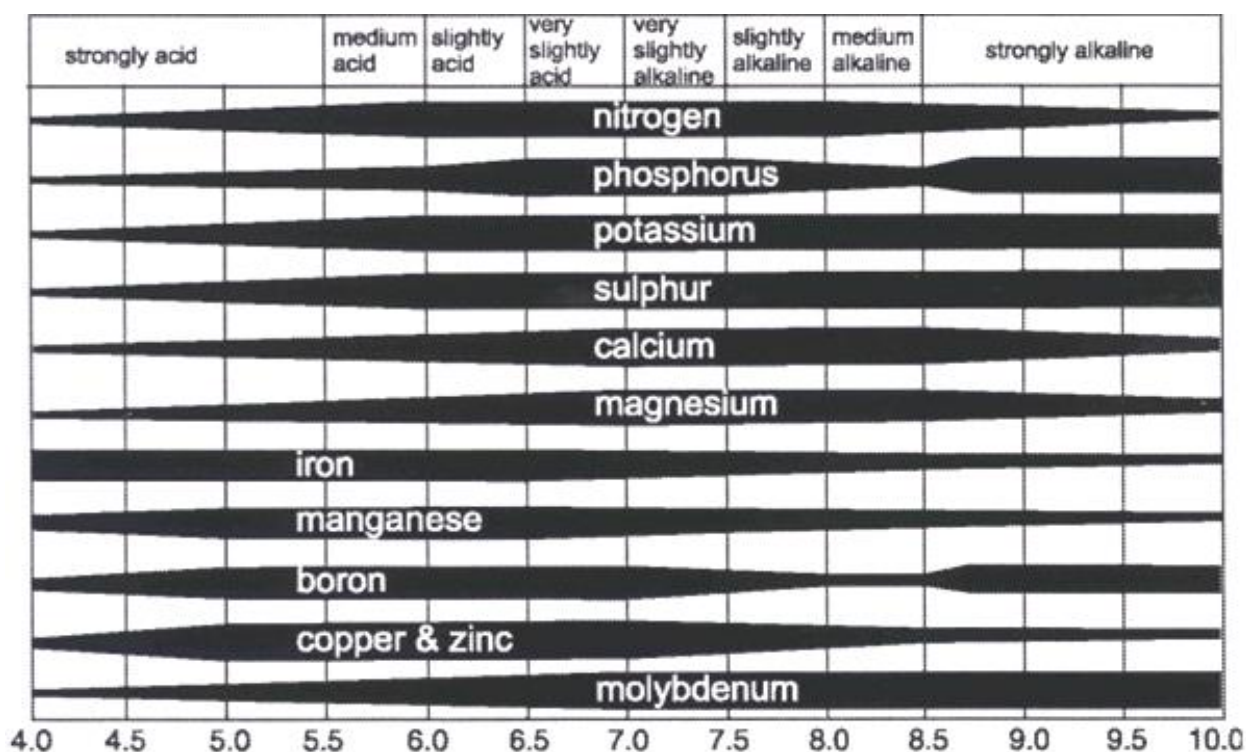
What is pH?

Soil pH is a primary factor in the effectiveness of the fertilizer materials we apply. In very basic terms, the expression pH stands for “potential Hydrogen”. What is important to us is that it is a numeric measurement of acidity or alkalinity. Depending upon the soil pH, the nutrients needed for plant growth may not be available to the plant. As a result, incorrect soil pH causes nutrient deficiencies and undesirable conditions for a healthy landscape.

So what is a correct pH? This depends on the needs of the particular plant. Some plants, such as azaleas, gardenias and camellias, prefer lower pH soils. Some plants, such as hydrangea, grow in both higher and lower pH. Generally, however, most plants prefer a pH value that is slightly acidic.

How is pH measured? The pH of a soil is measured using a scale that ranges from 0 to 14. A pH of 1 is very acidic, 7 is neutral, and 14 is very alkaline. This scale is logarithmic, so every whole number value move is a change of a factor of ten, e.g. a pH of 5 is ten times more acidic than a pH of 6, but a pH of 5 is 100 times more acidic than a pH of 7.

The chart below shows the availability of many of the nutrients needed for plant growth at a variety of pH values. The wider the nutrient bar, the more available the nutrient is to the plant.





GREENUP SERVICE PROTOCOLS

Soil pH

How will turf look if the pH is not in the proper range? If the soil pH is low or high, the turf will have poor lateral growth and leaf color will be yellow (chlorotic).

How will shrubs look if the pH is not in the proper range? This varies greatly due to the requirements of the ornamental, but dark veins with chlorotic tissue in between and an overall yellowing (chlorosis) of the leaves are the two most common. Plants are characterized as poor quality, non-vigorous, and do not seem to respond to nutritional treatments.

Nutrients such as Fe and Mn are increasingly unavailable to plants at higher pH values, where others become unavailable to plants as pH becomes more acidic.

It is important to keep in mind that pH is not the only item that will affect growth and color. It could be that the nutrient(s) needed are not present in sufficient amounts for proper plant growth or it may be that the roots are not able to absorb the nutrients due to a disease issue. However, pH is a very good starting point in your diagnostic process in determining the cause of a growth or color problem.

Never make an assumption about the pH of a soil; always test the pH before making any type of pH adjustment. It is possible for the soil under well-established oak or pine trees to become acidic. Alkaline soils are sometimes found in areas where subsurface fill has been used, in coastal areas where high levels of calcium are prevalent, or in areas where the pH of the irrigation water is particularly high.

When to Sample

There are three times to take samples to determine soil pH:

- 1) At the time of sale.
- 2) Annually during the aeration service.
- 3) Whenever there is a problem with the lawn's color or growth.

How to Sample

A soil sample for pH testing is pulled using a soil probe. If the test is for a general sampling of the pH, pull 5 to 10 cores throughout the entire shrub bed or turf area. If the sample is for a specific problem, pull 5-10 cores from the affected areas and 5-10 cores from the non-affected areas, analyzing the two samples separately. By pulling two samples, a comparison can be made between the pH levels in the good and problem areas. This will help you to identify if the problem is truly related to soil pH.

The soil sample should be taken to the depth of 6 inches because this is where the roots are. Obtain the pH value by taking root zone cores from an area of similar conditions, and mixing them up in a bag.

If sampling areas where turf has been recently installed, sample the soil below the sod base so the indigenous soil is being sampled.



GREENUP SERVICE PROTOCOLS

Soil pH

Using the Hellige-Truog pH Tester

The Hellige-Truog pH test kit is provided for all Inspectors who may sell GreenUP services. (A pH reading is required for all GreenUP sales.) This kit uses a liquid reagent and soil reaction powder to provide a color-metric indication of the soil pH.

- Collect soil samples as described previously.
- Place each sampling group in a plastic bag or other container to combine and mix the soil cores.
- The pH kit comes with a plastic tray containing 4 circular depressions. Add 2 to 3 drops of liquid reagent to the depression depending on the number of samples being tested. One or two samples per sampling group are sufficient.
- The pH kit also comes with a very small spoon-like device. Add a small amount of soil using the spoon device to the liquid reagent until the soil has absorbed the reagent and the soil is saturated.
- Mix and crush the reagent saturated soil with the backside of the plastic spoon device.
- Sprinkle the reagent powder lightly over the saturated soil and allow time for the powder to absorb the moisture and show the color.
- Match the color of the sample to the pH color chart. Some colors will be slightly darker or lighter than a color on the chart. This is indicating that the pH level is between the two readings.

Soil pH sampling during the initial inspection can be very impactful for a potential customer. Soil pH is crucial to agronomics. The sampling process provides visual evidence of our agronomic competency and sampling at the time of sale helps to separate us from the other companies that may be providing estimates.

What to do with the results

Document the results of the customer's pH on the Inspection Report & Graphical Analysis as well as the Start Sheet. The results, area sampled and the date the sample was taken must ultimately be entered in the permanent notes field in the customer database system for future reference.

When pH adjustments are required at the time of sale, the appropriate charges must be applied to the initial service.

The ideal pH range for St. Augustine turf is between 6.0 and 6.8; Zoysia, Bermuda and Tall Fescue between 5.0 and 6.5; and for Bahia or Centipede between 5.0 and 6.0.

Most shrubs and trees will perform well in pH ranges of 5.0 to 6.5. Some shrubs such as Azaleas, Camellias and Gardenias prefer a more acidic soil in the range of 4.5 to 6.0.



GREENUP SERVICE PROTOCOLS

Soil pH

Soil pH Adjustment

Soil pH adjustment is typically a slow process and may often be temporary. Soil pH reaction to products like lime and sulfur may take months. It is often necessary to repeat these applications to achieve desired results. Soil pH monitoring is needed indefinitely, which is why we do it at least once a year. The customer must be informed of the proper expectation for this situation.

If the soil pH needs to be raised $\frac{1}{2}$ of a point to be in the proper range, apply 25 pounds of lime per 1000 sq. ft. If the pH needs to be raised 1 full point to be within the proper range, apply 50 pounds of lime per 1000 sq. ft. Lime takes time to react in the soil and provide a change in the pH. Check the pH 3 months after application. If necessary, an additional application can be made at that time. Do not make more than 2 applications in a 6 month period. Do not apply more than 100 pounds of lime per 1000 sq. ft. per year.

If the soil pH needs to be lowered by $\frac{1}{2}$ of a point or more, granular sulfur will need to be applied at **4 to 8** pounds per 1000 sq. ft. Do not apply granular sulfur to wet turf as it can burn the plant tissue, particularly if the material is dusty. See protocol "Lowering pH for Zoysiagrass lawns".

Ammonium Sulfate (20-0-0) is a water soluble nitrogen source that has some soil acidifying effects. However, it should not be used for the sole purpose of acidifying the soil. When using 20-0-0, you are applying a readily available nitrogen source. Excessive nitrogen will increase thatch buildup and increase the incidence and severity of Large Patch Fungus; this is a particular concern in the case of Zoysiagrass. Applications of ammonium sulfate or fertilizers containing ammonium sulfate in addition to our regularly scheduled program should only be performed when an increase in vegetative growth is desired.

Also consider that state law prohibits the use of water soluble nitrogen at rates greater than $\frac{1}{2}$ pound of nitrogen per 1000 sq. ft. per application. The maximum amount of 21-0-0 that can be applied at any given time is 2.5 pounds per 1000 sq. ft. Additionally, some local ordinances prohibit the application of water soluble nitrogen unless it is combined with 50% slow release nitrogen.

Instructions to the customer after an application of any of the products mentioned above is to apply $\frac{1}{4}$ inch of water to move the product off the plant material and into the soil.

If the turf is chlorotic (yellow) apply a chelated micronutrient solution as a foliar spray (0-0-1 in Florida or Ferromec AC in Georgia) in addition to adjusting the pH as described above. Include a wetting agent and delay watering for at least 2 hours after application.



GREENUP SERVICE PROTOCOLS

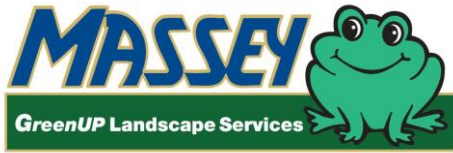
Soil pH

Remember that the important aspect of soil pH is to achieve proper plant health. Except in the case of newly installed plants or turf, if the plant looks healthy, leave the pH alone; the goal is healthy plants, not a perfect pH reading. Newly installed plants or turf may be adversely affected by the soil pH at a later time since they have not yet rooted into the indigenous soil. Because of this, the soil pH should still be adjusted. Soil pH adjustment using the information in this protocol is not only for turf, but also applies to trees, palms and shrubs; be mindful that the usage rates listed are to cover an area of 1000 sq. ft.

Using the Digital pH Meter

In cases when getting an exact pH reading is necessary, the sample is brought into the Service Center and a digital pH meter is used. The digital pH meter is a sensitive piece of equipment. Read the directions before use. At no time is the sensor of the pH meter stuck into the soil.

- Mix the soil sample with distilled water using 2 parts water to one part soil.
- Thoroughly stir the soil in the water using a plastic spoon.
- Allow the mixture to sit for several minutes before testing.
- While the mixture is sitting, calibrate the pH meter.
 - Turn the meter on
 - Place a drop or two of the 7.0 buffer solution onto the sensor
 - Press and hold the calibration button until 7.0 appears, then release. The meter will signal when the calibration is done. Rinse the sensor with distilled water.
 - Repeat the procedure for the 4.0 buffer solution and then rinse the sensor with distilled water.
 - After calibration, you are ready to test.
- Using the eye dropper provided, collect some of the water from the soil and water mixture.
- Place a few drops of the water onto the sensor surface.
 - Do NOT stick the sensor into the soil.
- Allow the meter to complete the test. The meter will signal the reading complete when a "happy face" appears or when the reading remains steady.
- Rinse the water solution off the sensor and *gently* blot the sensor with a paper towel before testing the next sample.
- There is no need to recalibrate between samples when multiple samples are being run at the same time.



WEEKLY TRAINING SESSION



Gray Leaf Spot

Topic Category: Lawn

Recordable Verifiable Training Hours: 1

Objectives: This lesson is designed to teach the basic biology and management of gray leaf spot.

Length of lesson: Approx 60 minutes.

Materials needed:

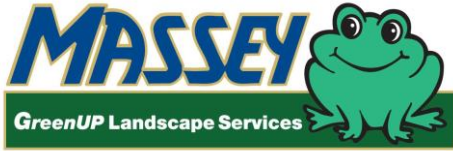
- Training outline
- Gray leaf spot Protocol (G: Drive\Shared\GreenUP Reference Materials\GreenUp Protocols\Individual Protocols\Lawn Damaging Diseases)
- Samples from the field, if available
 - If samples of the disease are not available, color photos can be used.
- Pre and Post tests

Training Guidelines:

- This training qualifies for Department of Agriculture ID Card Holder Training. Complete a Department of Agriculture ID Card Holder Training for each Team Member and maintain it in their personnel file at your office.

Make copies of the tests and training material for all Team Members attending.

- Set up the training area in an area of the office that will minimize disruptions.
- Begin the meeting by defining the training topic and handing out the pre-test
 - Allow a few minutes for all Team Members to complete the pre-test.
 - Collect the pre-test and hand out the Verifiable Training Record form.
- Distribute and review the training materials on gray leaf spot. Use the Training outline as a guide for key points.
 - Encourage active participation from all Team Members
 - Ask probing questions to develop key points
 - Encourage group reading
- After reading and reviewing the materials in the lesson, ask questions to verify the material has been understood.
- Hand out the post-tests. When complete, grade the tests and record the score on the Verifiable Training Record form.
- Collect tests and place with the verifiable materials in the Service Center Verifiable Training File.
- Make copies of the Verifiable Training Record and place in each Team Member's personal training file.
- Complete all Weekly Training through Massey University.



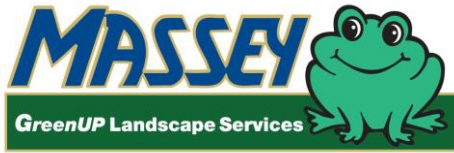
WEEKLY TRAINING SESSION



Gray Leaf Spot

Training Outline

1. Review the protocol for gray leaf spot. Point out the key items including:
 - Description of the disease. Pass around samples or pictures to help in identification of the disease.
 - Host plants
 - Typical symptoms (how to ID this problem)
 - Conducive conditions
 - Control measures
 - Disease triangle and breaking the cycle by removing one of the three components
 - The importance of cultural control
 - Explain proper chemical control



WEEKLY TRAINING SESSION



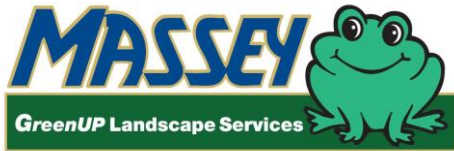
Gray Leaf Spot

Name _____

Date _____

Pre/ Post Test

1. What time of year is gray leaf spot most active?
 - a. Early spring
 - b. Summer
 - c. Fall
 - d. Winter
2. Symptoms of Gray Leaf Spot appear as...
 - a. blue gray areas
 - b. leaf spots on the grass blades in fist size patterns
 - c. circular to oblong leaf spots that are tan to brown in color with distinctive brown margins
3. T or F Temperatures in the mid 80's to low 90's, high humidity and summer rains will favor the development of gray leaf spot.
4. T or F Gray leaf spot is a common problem in areas of previous drought damage.
5. T or F Gray leaf spot symptoms can literally appear over night.
6. T or F High rates of quick release nitrogen will discourage the spread of gray leaf spot.
7. T or F The fungicide we use to control gray leaf spot is Affirm.
8. T or F This fungicide is applied using the backpack sprayer and the 11010 spray tip.



WEEKLY TRAINING SESSION



Gray Leaf Spot

Answer Key

Pre/ Post Test

1. What time of year is gray leaf spot most active?
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 - ☒ b. Summer
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GREENUP LAWN, TREE & SHRUB CARE SERVICE PROTOCOLS

Gray Leaf Spot Fungus

In the summer, there are many fungal pathogens that will attack turf grass blades. Warm temperatures, ample rainfall and actively growing turf during this time of year meet all of the requirements for a disease to flourish. One of the more common diseases we see in the Southern U.S. is gray leaf spot.

GRAY LEAF SPOT

Gray leaf spot is one of the more common fungal pathogens of St. Augustine grass. It is observed from late spring to early fall and is most frequently seen during periods of warm weather, high humidity and heavy rainfall. You will find a slight infection in almost every St. Augustine lawn in Florida during the summer months, but rarely is severe damage observed (Figure 1).



Figure 1.

Pathogen

The fungus *Pyricularia grisea* is responsible for gray leaf spot. It was first reported in 1971 and is found throughout Florida and Southern GA. Other host grasses include annual and perennial ryegrasses as well as tall fescue.



GREENUP LAWN, TREE & SHRUB CARE SERVICE PROTOCOLS

Gray Leaf Spot Fungus

Symptoms

Initial symptoms include the development of small, pinhead size spots that are olive-green to brown in color (Figure 2). These spots enlarge to form circular to oblong areas that are tan to brown in color with distinctive brown margins. The discolored area may become covered in spores, giving the spots a “felted” gray appearance (hence the name gray leaf spot).

A single leaf blade may have many spots, causing dieback of the leaf tips. This will cause the blade to wither and turn brown (middle blade in Figure 2). Severe infections can cause death of the plant resulting in “melted out” patches throughout a lawn.



Figure 2.

Conducive Conditions

Typical summertime conditions are required for the disease to thrive and spread. Environmental factors that favor infection include:

- Temperatures in the mid 80s to low 90s
- High humidity >80%
- Prolonged leaf wetness (3 hours or more).
 - *Research has shown that at higher temperatures (>90°) the pathogen needs only 1 hour of leaf wetness to infect the plant.*

Turf is most susceptible to gray leaf spot when it is stressed or lacks dense cover. Common areas to find gray leaf spot are:

- Drought stress
- Herbicide injury
- Newly plugged areas

The fungus can produce a large amount of spores in a very short time (up to several million spores in just a couple days). As a result, symptoms can spread suddenly once conditions become conducive. It is not uncommon for this disease to literally appear “overnight”.



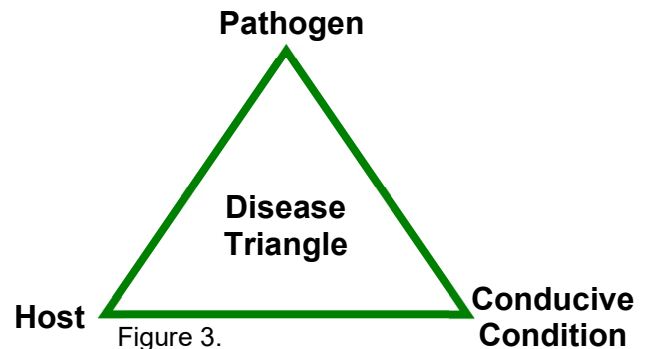
GREENUP LAWN, TREE & SHRUB CARE SERVICE PROTOCOLS

Gray Leaf Spot Fungus

Control

Once the disease has infected the plant, control is required. To control this disease, refer to the Disease Triangle (Figure 3). In order for a disease to thrive and reproduce, it needs three things:

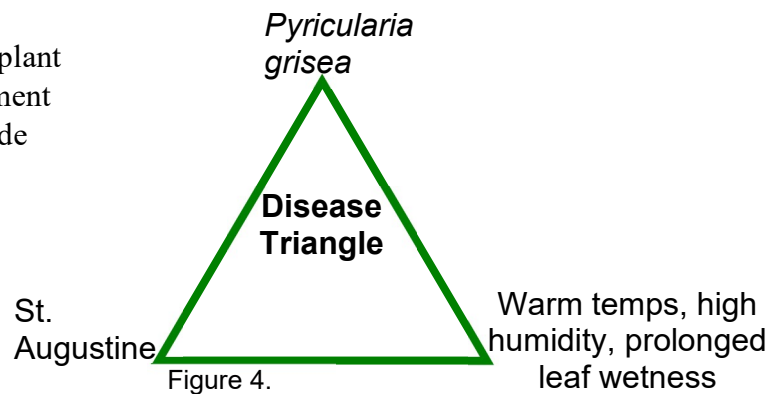
- The Pathogen
- The Host
- The Conducive condition



The removal of any one of these three factors will result in the control of the disease. The Disease Triangle for gray leaf spot is represented by Figure 4.

Control can be achieved by:

- Replacing with another plant
- Changes in the environment
- Application of a fungicide



Cultural methods are always preferred for disease control. The cultural control methods for gray leaf spot include:

- Limit nitrogen applications. High rates of quick release nitrogen predispose turf to infection. If nitrogen fertility is required, apply slow release or very low levels of quick release nitrogen.



GREENUP LAWN, TREE & SHRUB CARE SERVICE PROTOCOLS

Gray Leaf Spot Fungus

- Avoid drought injury by ensuring proper irrigation coverage during the dryer spring months.
- Avoid prolonged leaf wetness. This may be difficult during the rainy season, but educate your customers to not water in the evening as this will provide the conducive conditions even when the rain does not.
- Alleviate compacted soils by aerating. Compacted soils weaken the turf making it more susceptible to disease infestation.
- Avoid walking or mowing infected areas. The spores can be easily spread on the soles of shoes and mower blades. Walk through an infected area only if making a disease treatment.

When the severity of the problem warrants a fungicide application, spot treat using Transom. The application rate for Transom is 3 ounces per 1000 sq. ft. This amount of material is used for each gallon of water in the back-pack applicator using the 8010E spray tip. One gallon should cover 600 sq. ft. Multiple applications may be required during periods of favorable conducive conditions. After a fungicide application is made, the disease will temporarily stop spreading and the turf will begin to recover.

Tuliptree Scale

Topic Category: Lawn

Recordable Verifiable Training Hours: 0.5

Objectives: This lesson is designed to teach our Specialists and Inspectors about Tuliptree Scale.

Length of lesson: Approx 30 minutes.

Materials needed:

- Training Guideline
- Tuliptree Scale Protocol G:\Shared\GreenUp Reference Materials\GreenUp Protocols\Individual Protocols\Tree Care
- Pre- and Post- tests.

Training Guidelines:

- Make copies of the tests and Tuliptree Scale Protocol for all Team Members attending.
- Set up the training area in an area of the office that will minimize disruptions.
- Begin the meeting by defining the training topic and handing out the Pre-test
 - Allow a few minutes for Team Members to complete the Pre-test.
 - Collect the pre-test and hand out the Verifiable Training Record Form (VTRF)
- Distribute and review the information on Tuliptree Scale.
- Use the Training outline as a guide for key points.
 - Encourage active participation from all Team Members
 - Ask probing questions to develop key points
 - Encourage group reading
- After reading and reviewing all materials, ask questions to verify the lesson has been understood.
- Hand out the Post-tests. When complete, grade the tests and record the score on the VTRF.
- Collect tests and place with the verifiable materials in the Service Center Verifiable Training File.
- Make copies of the VTRF and place in each Team Member's training file.
- Complete all Weekly Training through Massey University.



Tuliptree Scale

Name _____

Date _____

PRE & POST TEST

1. T or F Tuliptree Scale is only found on Tuliptrees.
2. T or F Tuliptree Scale is one of the smallest scales in the U.S.
3. T or F Each adult female Tuliptree Scale will produce as many as 3000 crawlers.
4. T or F The adult male Tuliptree Scale looks like a tiny wasp.
5. T or F Tuliptree crawlers can be spread on the feathers of birds.
6. T or F Large numbers of these scales can give an infested twig a warty appearance.
7. T or F Infestation of this scale can be so prolific that it can cover infested twigs and branches.
8. T or F Feeding from Tuliptree scale can cause death to a Magnolia tree.
9. T or F Control of Tuliptree scale in large trees can be accomplished with a spray of our Shrub I&D Slurry.

TRAINING SESSION

Tuliptree Scale

PRE & POST TEST ANSWER KEY

1. T of ☒ F Tuliptree Scale is only found on Tulip trees.
2. T of ☒ F Tuliptree Scale is one of the smallest scales in the U.S.
3. ☒ T or F Each adult female Tuliptree Scale will produce as many as 3000 crawlers.
4. ☒ T or F The adult male Tuliptree Scale looks like a tiny wasp.
5. ☒ T or F Tuliptree crawlers can be spread on the feathers of birds.
6. ☒ T or F Large numbers of these scale can give an infested twig a warty appearance.
7. ☒ T or F Infestation of this scale can be so prolific that it can cover infested twigs and branches.
8. ☒ T or F Feeding from Tuliptree scale can cause death to a Magnolia tree.
9. T of ☒ F Control of Tuliptree scale in large trees can be accomplished with a spray of our Shrub I&D Slurry.

Tuliptree Scale

Tuliptree Scale

Toumeyella liriodendri (Gmelin)

Identification:

Tuliptree Scale is one of the largest soft scales in the U.S. Mature females grow to over 1/4th inch in diameter. They are oval, convex, and have a distinct flange around the margin of its protective waxy cover. The waxy covering of a mature female varies from light grayish green to pinkish orange mottled with black. The body fluid of a live female is also pinkish orange. Adult males are small and only have one pair of wings. Adult males may look like tiny wasp parasitoids as they crawl across the surfaces of an infested plant. The crawler stage is dark red and about 0.5 mm long.



Biology:

This pest overwinters as second instar nymphs and resumes feeding in early spring. Males emerge from the waxy scale covering as small, two winged individuals. They mate with the females and die. By summer, mature females give birth to first instar nymphs (crawlers). Each female may produce as many as 3,000 crawlers over several weeks. Crawlers are capable of moving around in a tree. They may be spread to new host trees by wind or on the feathers of birds. Once the crawlers find a favorable site, they insert their piercing-sucking mouthparts into the vascular system of the tree and begin to feed.

Damage:

Large numbers of these soft scales may give an infested twig a warty appearance. One of the first indications of an infestation of this pest is the abundance of honeydew and sooty mold. Ants seeking the honeydew are often found. The ants may also need to be managed since they will not only protect and farm the scale for honeydew, but because they will invade and nest in structures. Feeding by this pest will weaken trees by removing the plant fluid. In many instances this scale will be so prolific that it covers all of the twigs and branches. Feeding from a heavy infestation can result in a rapid decline and even death of large established trees. Magnolias have been the most commonly infested trees in our service area.

Control: This scale will require aggressive treatment and follow-up for control. Small trees can be sprayed with our I&D Slurry plus Horticultural Oil. A drench of the root system will be required; follow-up to reapply the spray in 10 to 14 days. Mid-Sized (under 6 inches in diameter at chest height) non-fruit bearing trees can be drenched with Imidacloprid using our Imidacloprid Mid-Sized Tree Drench Protocol. This treatment will work best when applied in the early spring. Large trees (6 inches and greater in diameter at chest height) can be treated with the Arborjet system using Ima-jet.

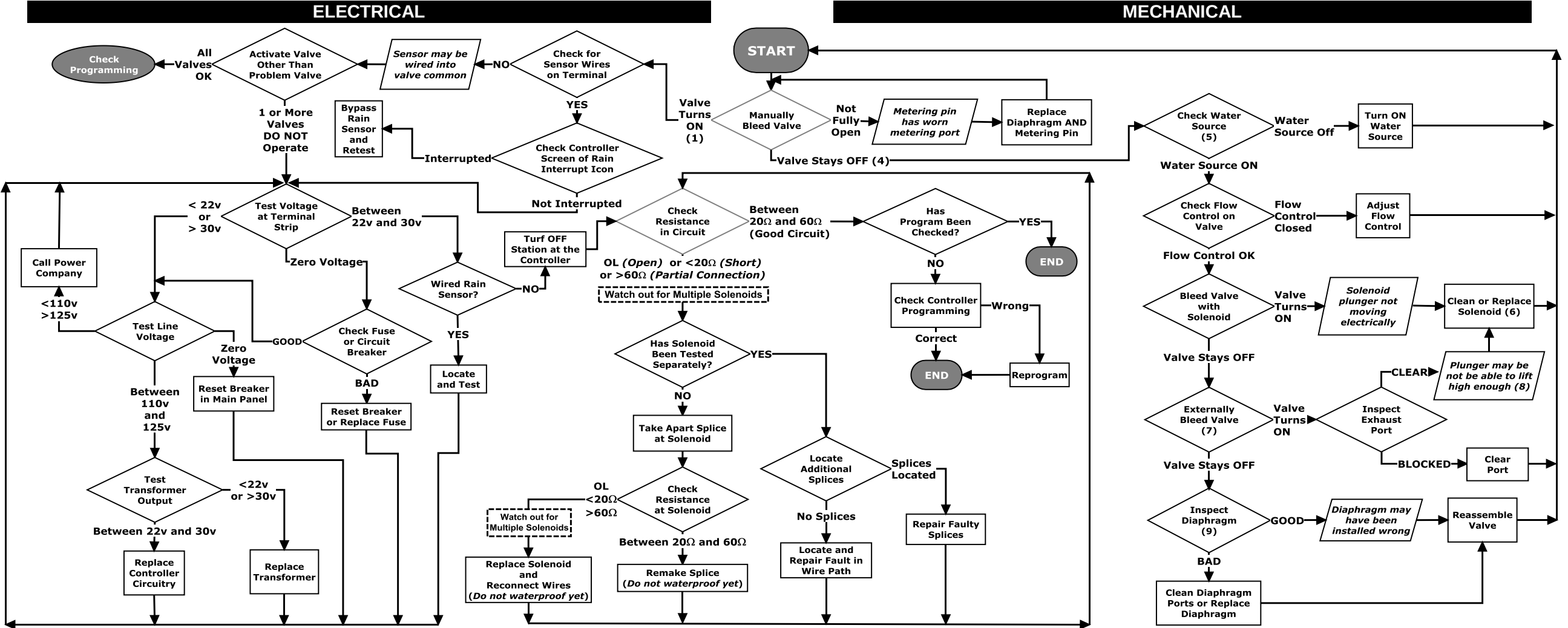
Host list: Magnolia, Yellow Poplar and Tuliptrees.

Irrigation Troubleshooting Flowchart



v7.15

Valve Will **NOT** Turn **ON** (or is Partially Opening)



NOTES:

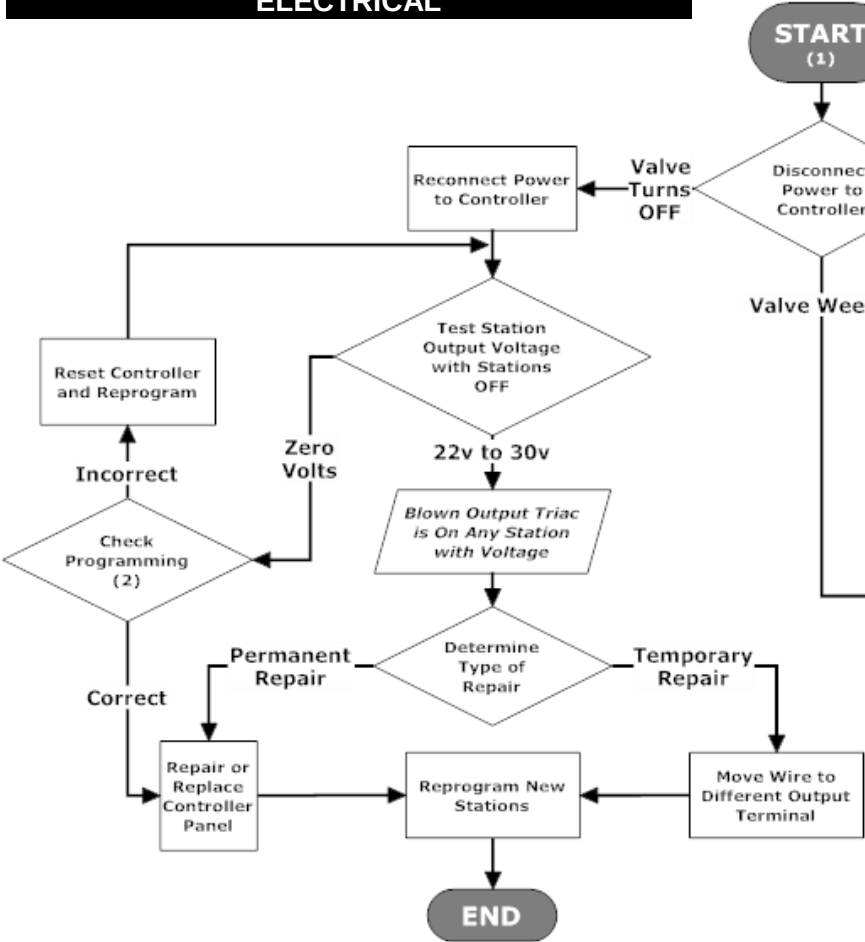
- (1) The problem may not show itself because the cause is intermittent. Identify what time of day/night the zone is programmed to run and find out what is going on at THAT time of day.
- (2) Turn on a different station other than the problem zone.
- (3) Rain switch may be active if second zone does not activate.
- (4) ¼ turn solenoid may not open valve if air is trapped above diaphragm (after a mainline break, new installation, or winterization). External bleed may have to be used.

- (5) The source type (Pump or Municipal) each have their separate issues. See *Water Source Troubleshooting Flowchart*.
- (6) Replace solenoid without cutting wires to old solenoid until solenoid is confirmed to be the problem. To clean solenoid with captive plunger, remove screen and retainers to expose plunger in solenoid.
- (7) If no external bleed screw, unscrew solenoid until water is exiting under solenoid.
- (8) Over-tightening a solenoid can crush the o-ring, damage port extension, or damage the solenoid threads
- (9) Remove bonnet and diaphragm carefully to avoid disturbing any debris that may be present under the diaphragm.

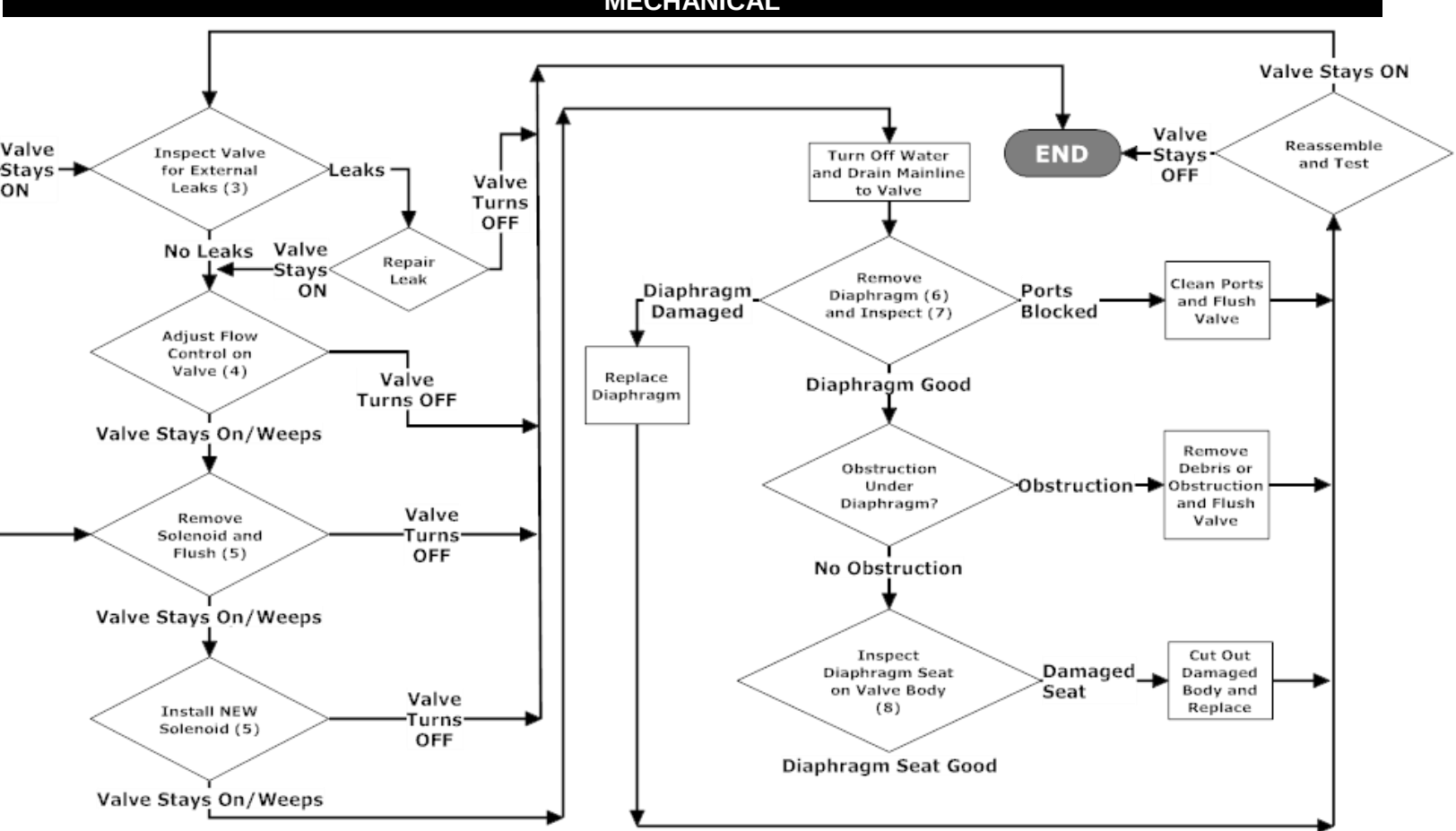
Irrigation Troubleshooting Flowchart

Valve Will **NOT** Turn **OFF** (or is Weeping)

ELECTRICAL



MECHANICAL



NOTES:

- (1) Water will probably be off by the time a service tech arrives. Be sure to turn on water to see if valve is actually stuck on. For pump systems, turn on a station other than the valve in question to see if questionable valve also comes on.

(2) Look for multiple start times, stacked start times, multiple cycles, repeats, runtime set in hours instead of minutes, or excessively long runtimes.

(3) Leaks can be coming from the threads of the solenoid, from around the external bleed screw, a bleed lever left in the on position, or leaks coming from between the bonnet and valve body.

(4) If the valve is oversized for the flow of the zone (e.g. a 1½" valve operating at 30 gpm or less), fine-turn the valve (valve should be off) by turning the flow control completely "off", then opening 2 full turns. Activate the valve and slowly open the flow control until sprinklers are observed to be operating properly for nozzles and spacing.
- (5) Replace solenoid without cutting wires to old solenoid until solenoid is confirmed to be the problem. To clean solenoid with captive plunger, remove screen and retainers to expose plunger in solenoid.

(6) Gently remove the diaphragm in order to minimize disturbing any debris under the diaphragm. This will help identify the obstruction, if any.

(7) If the valve is a standard-flow valve, (water ported through the center of the diaphragm), look for a tear or hole. Inspect the diaphragm ports and filter/screens for blockage. Inspect the seat area on underside of diaphragm for nicks or imbedded sand. If imbedded sand exists, also inspect the diaphragm seat of the valve body for wear from the abrasive sand.

(8) Debris caught between the diaphragm and the seat can chip or nick the plastic diaphragm seat of the valve body causing the valve to continually weep water through the lowest sprinklers. The valve body must be replaced.