Chapter 9 - Needlesticks

There are about 800,000 accidental “needlesticks” each year. About 2 percent of used needles are contaminated with HIV that can cause AIDS and even more with hepatitis B and C. These diseases and others can be transmitted by accidental needlesticks. Nurses, physicians, and other medical professionals experience roughly two thirds of needlestick injuries, but others are at risk. Housekeepers, maintenance workers, and service personnel, such as pest control technicians, are at risk when working in medical facilities, homes of people under medical care, or sites of illegal drug use.

The risk that you will become infected with hepatitis or HIV from a needlestick is very low, but maintenance workers and other non medical people have been infected just that way. Minimize your risk. Be alert to discarded needles under beds and furniture, inside cabinets and drawers, in trash cans, or under crawlspaces. ***Never reach into areas where you cannot see, such as under a bed***. If you work in patient areas of medical facilities, be sure to understand and follow any safety procedures recommended by that facility. Such procedures might include wearing two pairs of gloves.

<u>First Aid After a Needlestick</u>

1. Vigorously scrub the contaminated area for 15 minutes with an iodine solution and large amounts of water. If an iodine solution is not available, scrub with soap (antibacterial if available) and water for 15 minutes.
2. Inform the appropriate medical supervisor (if in a medical facility) or facility manager and call your Service Center.
3. Save the needle so it can be tested.
4. Notify your physician.

   Note: Steps 1-4 should be done as quickly as possible. Do not delay.

5. Write down the details of how the exposure occurred.
6. Get yourself tested for hepatitis and HIV.
7. Make sure that your supervisor makes arrangements to have the person who owns the needle tested to determine whether they are HIV or hepatitis positive.

Big Headed Ants

Identification, Biology, and Behavior

Big-headed ants are medium sized and light brown to dark brown in color. They have two nodes in their petiole, and have two spines pointing up from the back of the thorax (Figure 1). The antenna has a distinct three segmented club.

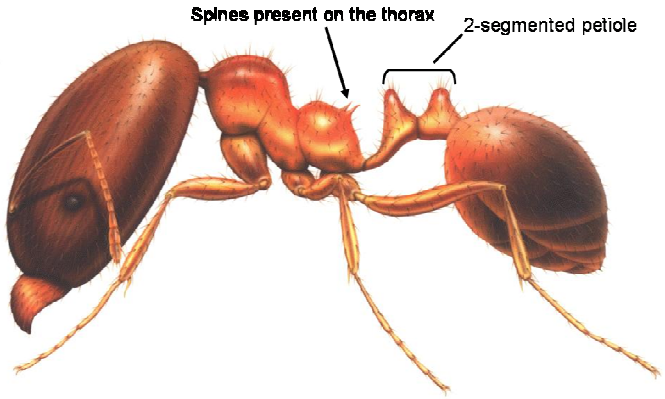


Figure 1: Physical characteristics of the big-headed ant.

Big-headed ant workers are dimorphic which means they have two sizes—minor workers and major workers. The minor workers' body regions are proportionate in size whereas the major workers' heart-shaped head is disproportionately larger than the rest of the body. The majority of the colony is made up of the minor workers; only about 1% of the foraging population is made up of the major workers.

Figure 2: Dimorphism in the big-headed ant: the minor worker (left) and the major worker (right)

The big-headed ant is soil-nesting and is sometimes confused with subterranean termites because of its ability to construct foraging tubes that are similar, albeit much more fragile, than termite tubes.
Because big-headed ant colonies consist of multiple queens who are capable of reproducing, they form large supercolonies, ranging from several thousand to millions of individuals. These super-colonies consist of interconnected nests that can cover multiple residential lot areas.

The orange adult reproductive male is about ¼" and the darker female is about 3/8" long.

Identifying Nesting Sites

Figure 3: Big-headed ant mounds constructed of loose dirt.

Because big-headed ants are soil dwelling, infestations will typically originate from outside or under a structure's foundation. They may be seen trailing along edges of foundations, driveways, sidewalks and other structural guidelines. Nests consist of loose piles of soil with entrance holes present at the top of the mound (Figure 3). They will nest in protected areas such as under stones, landscaping timbers, stepping stones, brick pavers, logs or other debris, in potted plants, rotting wood, crevices and voids of walls, fences and bark of trees (Figure 4). Sometimes piles of soil are found indoors along expansion joints and baseboards. This is soil that has been excavated by ants building a nest under the slab foundation.

Figure 4: Big-headed ant nest in the base of a palm tree.

Control Techniques

Because big-headed ants are capable of forming supercolonies that occupy large areas they can be extremely hard to control.
In most cases, problems with big-headed ants are not confined to only one or two homes in an area or even an entire subdivision. This gives Sales Inspectors and Technicians opportunity for proposing services for surrounding neighbors. Being able to treat in an area-wide manner will allow for more success in eliminating the populations.

Because big-headed ants forage below the sod layer, it is difficult to follow trails directly to a nesting site. Inspection should center on overturning stepping stones and landscaping timbers, digging in the soil around the base of trees, around structural guidelines such as the home's foundation and edges of the driveway, checking the perimeter of the yard and any fence lines, etc.

Identification and direct treatment of nesting sites can help reduce the amount of product that is applied into the environment. Reproductive queens are found in these nesting sites, so treatment with a "quick-kill" product will be most effective by the foundation. Treat active ants by the foundation directly with a repellent liquid residual (Temprid, Suspend, or Demand).

Because the colony consists of millions of individuals foraging from multiple sites, not all nesting sites may be identified and in turn, not all individuals will be eliminated. Ants, by nature are continuously foraging for food. Big-headed ants are primarily protein feeders. The broadcast application of the protein-based granular bait Amdro Pro to areas around where nests have been identified, but in areas away from the structure, will encourage foraging to these areas. Other ant baits are also effective but may take longer than a week to take effect. This will reduce the population of ants foraging towards a structure for food. Do not apply bait directly to nesting sites. Note, because all 3 of these baits are protein based, if they are applied just before a rain/lawn watering this can cause the protein bait to become rancid, resulting in non-acceptance of the bait. When ants are foraging on the structure, spot treat trails with an approved non-repellant liquid residual (Termidor). Repellant liquid and granular residuals applied along active trails (around the base of trees, trails around the perimeter of the property, etc) can help in reducing ant populations. Ensure that bait formulations are not placed directly in these areas where repellant residuals have been applied.

If ants are found foraging inside of a structure, spot treat trails with an approved non-repellant liquid residual (Phantom). In addition, locate the area or areas on the exterior of the structure where the ants are entering, spot treat with an approved non-repellant liquid residual (Termidor). Since big-headed ants are able to enter from under the slab and nest in wall voids, application of granular bait may be necessary for treatment. If this is the case, use either Extinguish Plus or Amdro Pro as a wall void treatment. Advion Fire Ant Bait is NOT labeled for interior or wall void use.

Pre/Post Test

Name:_____ Date:_____

Service Center:_____

Big-Headed Ants

1.) Big-headed ant nests by a home are best controlled by directly treating with:
   a) Liquid baits
   b) Granular protein baits
   c) A repellant liquid residual
   d) Gel baits

2.) Big-headed ants:
   a) are 1-noded and dimorphic
   b) are dimorphic and protein feeders
   c) are protein feeders with a sting that is painful only for the first day
   d) have a moderate sting

3.) Big-headed workers are called:
   a) majors and minors
   b) supers and soldiers
   c) minims and soldiers
   d) majors and soldiers
   e) minors and queens

4.) Big-headed ant colonies are primarily
   a) Arboreal
   b) Single queen colonies
   c) Soil dwelling
   d) Sweet feeders

5) Amdro Pro Bait is best used for big-headed ants:
   a) as a “quick kill” over mounds
   b) broadcast evenly throughout the yard away from the mounds to encourage foraging away from the structure
   c) as a perimeter barrier treatment when ants are heavy
   d) within wall voids if they have entered indoors
   e) b & d
   f) c & d

Answers: 1) c 2) b 3) a 4) c 5) e

WEEKLY TRAINING SESSION

Tree Care Protocols

Topic Category: Lawn
Recordable Verifiable Training Hours: 1.5 hours

Objectives: This lesson is designed to review the Specialty Treatment Agreement and to review all Tree Care Protocols so all Team Members are familiar with our options in providing tree care, how to price the available treatments and the procedures to deliver the service.

Length of lesson: Approximately 90 minutes.

Materials needed:

- Training Outline
- Specialty Treatment Agreement Protocol
- All Tree Care Protocols listed below (collated and stapled separately) and Tree Care Rate Card
- Pre- and Post- tests.

Training Guidelines:

- Make copies of all Tree Care Protocols (collated and stapled separately), Rate Card and the tests 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 the Team Members to complete the Pre-test during the meeting to capture key points. Since most of the information is new, using the Pre-Test to test their knowledge before reviewing the information would not make sense.
    - Hand out the Verifiable Training Record Form (VTRF)
- Distribute and review the Arborjet Protocols
    - Review the Protocols in the following order so the information coincides with the test.
        - Specimen Palm Injection Program
        - Redbay Ambrosia Beetle Program
        - Palm/Tree Injection for Insect Control
        - Edible Fruit Insect Control and Granular Fertilization for trees 6 inches or greater
        - Edible Fruit Insect Control and Granular Fertilization for trees less than 6 inches
        - Caterpillar Control for Large Trees
    - 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-Tests and 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 VTM's through Massey University.

WEEKLY TRAINING SESSION

Tree Care Protocols

Name _____ Date _____

PRE & POST TEST

1. T or F The Specimen Palm Injection Program provides treatment for insects, diseases and nutrition.
2. T or F Insect and nutritional treatments can be performed at the same initial visit with the Specimen Palm Injection Program.
3. Pricing for the Specimen Palm Injection Program is $_____ per inch of trunk diameter at chest height per visit and is performed _____ times per year.
4. The agreement to use for a Specimen Palm Injection Program sale is the _____.
5. T or F The Redbay Ambrosia Beetle Program is only needed for Redbay trees.
6. T or F The Redbay Ambrosia Beetle introduces a disease into the tree upon entry.
7. T or F The Redbay Ambrosia Beetle Program includes one annual injection for the prevention of disease and 4 liquid applications for the prevention of Ambrosia beetles.
8. The agreement to use for a Redbay Ambrosia Beetle Program sale is the _____.
9. T or F The Redbay Ambrosia Beetle Program can be used to protect Avocado trees.
10. T or F The Redbay Ambrosia Beetle Program offers a replacement guarantee for plant material.
11. T or F The Invasive Whitefly, Royal Palm Bug, Scales and Palm Bud Weevil are all controlled using an annual service with twice a year injection.
12. T or F Caterpillars and Palm Leaf Skeletonizers are included with the twice a year Palm/Tree Injection for Insect Control
13. T or F Imidacloprid will control caterpillars, spider mites and palm leaf skeletonizers.
14. The cost of the Palm/Tree Injection for Insect Control annual service is $____ per inch of trunk diameter at chest height and is performed _____ times per year.
15. T or F The insect control material used for edible fruit trees can be used the same day as the fruit is harvested.
16. T or F Our Edible Fruit Insect Control and Granular Fertilization program includes granular fertilizer applied 3 times per year spring through fall.
17. Edible Fruit Trees 6 inches or greater in diameter at chest height are injected _____ times per year.
18. Edible Fruit Trees less than 6 inches in diameter at chest height are sprayed _____ times per year.
19. T or F Caterpillar control for large trees is sold as an annual service performed twice a year.
20. T or F The Specialty Treatment Agreement is used to document the sale of an Injection Service for Caterpillars in large trees.
21. The cost for injecting a large tree for caterpillars is $_____ per inch of diameter at chest height
22. T or F All tree injection sales must be accompanied by a graph identifying the location and number of the trees to be treated.

WEEKLY TRAINING SESSION

Tree Care Protocols

PRE & POST TEST ANSWER KEY

1. T or F The Specimen Palm Injection Program provides treatment for insects, diseases and nutrition.
2. T or F Insect and nutritional treatments can be performed at the same initial visit with the Specimen Palm Injection Program.
3. Pricing for the Specimen Palm Injection Program is $__6___ per inch of trunk diameter at chest height per visit and is performed _____four_____ times per year.
4. The agreement to use for a Specimen Palm Injection Program sale is the _Specialty Treatment Agreement__
5. T or F The Redbay Ambrosia Beetle Program is only needed for Redbay trees.
6. T or F The Redbay Ambrosia Beetle introduces a disease into the tree upon entry.
7. T or F The Redbay Ambrosia Beetle Program includes one annual injection for the prevention of disease and 4 liquid applications for the prevention of Ambrosia beetles.
8. The agreement to use for a Redbay Ambrosia Beetle Program sale is the _Specialty Treatment Agreement__.
9. T or F The Redbay Ambrosia Beetle Program can be used to protect Avocado trees.
10. T or F The Redbay Ambrosia Beetle Program offers a replacement guarantee for plant material.
11. T or F The Invasive Whitefly, Royal Palm Bug, Scales and Palm Bud Weevil are all controlled using an annual service with twice a year injection.
12. T or F Caterpillars and Palm Leaf Skeletonizers are included with the twice a year Palm/Tree Injection for Insect Control
13. T or F Imidacloprid will control caterpillars, spider mites and palm leaf skeletonizers.
14. The cost of the Palm/Tree Injection for Insect Control annual service is $_7___ per inch of trunk diameter at chest height and is performed _____two_____ times per year.
15. T or F The insect control material used for edible fruit trees can be used the same day as the fruit is harvested.
16. T or F Our Edible Fruit Insect Control and Granular Fertilization program includes granular fertilizer applied 3 times per year spring through fall.
17. Edible Fruit Trees 6 inches or greater in diameter at chest height are injected _____4___ times per year.
18. Edible Fruit Trees less than 6 inches in diameter at chest height are sprayed _____6____ times per year.
19. T or F Caterpillar control for large trees is sold as an annual service performed twice a year.
20. T or F The Specialty Treatment Agreement is used to document the sale of an Injection Service for Caterpillars in large trees.
21. The cost for injecting a large tree for caterpillars is $__10___ per inch of diameter at chest height
22. T or F All tree injection sales must be accompanied by a graph identifying the location and number of the trees to be treated.

GREENUP SERVICE PROTOCOLS

Insect Control and Fertilization for Edible Fruit Trees 6 Inches or Greater in Diameter

Insect control and fertilization can be performed for edible fruit trees such as citrus and mango with a trunk diameter of 6 inches or greater at chest height in the following manner:

The program is a yearly service performed on a quarterly basis. The Arborjet Injection System is used to provide insect control for edible fruit trees 6 inches or greater in diameter at chest height, using AzaSol. Only those individuals who have been fully trained in the Arborjet System may deliver this treatment.

AzaSol, a biological insecticide containing Azadirachtin derived from the Neem tree. There is no time restriction for harvesting fruit, meaning that the fruit can be harvested the same day a treatment is performed. See the label for directions of use.

Arborjet tree injection is performed by drilling small hole(s) into the trunk of the tree and inserting a plug that acts as a one-way valve. A needle is then inserted into the plug and the insect control material is injected into the vascular system of the tree. The same injection site is to be used as long as it will accept the material.

Fertilization is performed three times a year during the months of February through October with the regular quarterly treatment using the 8-2-12 palm fertilizer blend.

Pricing for trees greater than 6 inches diameter at chest height is $10 per inch per application.

Example: 4 trees with a trunk diameter of 6 inches at chest height each would be $240 per visit. Treatments are performed 4 times per year for a total of $960 per year.

The pricing includes both the insect control and the fertilization.

The Special Landscape Service Agreement is used to document the sale of these services. The cost of the first treatment is written in the box corresponding with the current month and the type of service being performed. The cost of the subsequent treatments is written in the same row and in the column corresponding with the months in which the every other month or quarterly treatments are performed.

The number and type of trees to be treated must be documented on a graph of the property to indicate the location of the trees.

Production commission for the quarterly service is paid at 5%.

Insect Control and Fertilization for Edible Fruit Trees Less than 6 Inches in Diameter

Insect control and fertilization can be performed for edible fruit trees such as citrus and mango less than 6 inches in diameter at chest height in the following manner:

The insect control material used for edible fruit trees is AzaSol, a biological insecticide containing Azadirachtin derived from the Neem tree. There is no time restriction for harvesting fruit, meaning that the fruit can be harvested the same day a treatment is performed.

Fertilization is performed three times a year using the 8-2-12 granular fertilizer applied at 1 pound per 100 sq. ft. of root zone area.

The program for small trees less than 6 inches of trunk diameter at chest height is a yearly service performed on an every other month basis. Insect control materials are sprayed from a back pack sprayer, but the sprayer must be clean of any insect or disease control materials that are not labeled for edible fruit trees. AzaSol is applied at a rate of 1 teaspoon per gallon of water. Thorough coverage of all foliage must be achieved to ensure successful results.

Fertilizer is applied in February or March, June or July and September or October with the regular insect control service, using the 8-2-12 palm fertilizer blend.

AzaSol is used for the treatment at a rate of 1 teaspoon per gallon from a backpack sprayer dedicated for this use.

Pricing for trees less than 6 inches diameter at chest height is a minimum of $40 per application or $20 per tree per application.

Example: 4 trees with a trunk diameter less than 6 inches each would be $80 per treatment. Treatments are performed six times per year for a total of $480 per year.

The pricing for includes both the insect control and the fertilization.

The Special Landscape Service Agreement is used to document the sale of these services. The cost of the first treatment is written in the box corresponding with the current month and the type of service being performed. The cost of the subsequent treatments is written in the same row and in the column corresponding with the months in which the every other month treatments are performed.

The number and type of trees to be treated must be documented on a graph of the property to indicate the location of the trees.

Production commission for the every other month program is paid at standard commission rates.

Mid-Sized Palm Treatment Protocol for Insects, Diseases and Fertilization

Shrub size palms such as Roebelenii, European fan, Foxtail or Alexander palms with a height of 10 feet or less are included in our shrub care program and treated as per our shrub care protocol. These palms should be priced into our shrub care program using the square footage of bed area.

Mid-sized Butia, Queen, and Washingtonian palms as well as specimen palms such as Canary Island Date or Dactylifera are also susceptible to many insects and diseases just like shrubs and they need fertilization. Provided these palms are less than 15 feet high and are located in an area that can be sprayed without getting spray drift onto vehicles, windows of structures or passersby, they can be included or added to our shrub care service.

Our standard shrub care service schedule is followed. If a customer has our shrub service, these types of palms can be added for $30 *per palm* per service. Pricing for these types of palms without our regular shrub care service is a minimum of $80 per treatment or $30 per palm per treatment, whichever is greater. Note the type and number of palms on the service agreement and the invoice screen. Also note that the palms will be treated until they reach a height greater than 15 feet. This price also includes fertilization three times per year just like the shrub care program, but our special palm fertilizer 8-2-12 (or 8-0-12 in areas where phosphorus applications are not allowed by ordinance) will be used.

Application procedure for foliage pests:
The spray application is performed using our standard Shrub Care program. The foliage is treated ensuring good coverage to the top and bottom sides of the leaves as well as the rachis (petiole or leaf stem). The bud of the palm (where the new leaves come out) should be sprayed heavily.

Application procedure for fertilizing mid-sized palms:
Fertilization is performed in the same months as we would shrubs. However, 8-2-12 (or 8-0-12) palm fertilizer is used. This material is scattered evenly from the trunk to the dripline of the palm and beyond where possible at a rate of 2 pounds per 100 sq. ft. Care must be given as to not cause injury when fertilizing near annuals or other plants that are within the area where the fertilizer needs to be placed for the palm. If shrubs are in the root zone of the palm, the palm fertilizer application would also feed the shrubs. If there is turf in the area needing to be fertilized, the palm fertilizer application will cause the turf in this area to be greener than the rest of the turf. The regular turf fertilizer will supply the needs of the palm in this situation or the palm fertilizer could be used to fertilize the turf, but both should not be done at the same time.

Since the area of the palm to be fertilized would be circular, the formula pi (3.14) times the square of the radius will be needed to figure the square footage. Example a palm with a 3 foot radius: 3 x 3 = 9, 9 x 3.14 = about 28.27 sq. ft. The rate of fertilizer can be figured with the following formula: 2 pounds divided by 100 sq. ft. = the rate of fertilizer per 1 square foot. The rate per 1 square foot times the square footage tells you how many pounds of fertilizer is needed. Fertilizer weighs about the same as it looks like in a measuring cup, so multiply the pounds needed times 16 to give you the number of ounces needed.
Example: 2 / 100 = 0.02, 0.02 x 28.27 = 0.5654 pounds of fertilizer. There are 16 ounces in a pound, so 0.5645 pounds x 16 ounces = about 9 ounces in a measuring cup needed.
There, now isn't that simple? To make it even easier, see the following page.

Mid-Sized Palm Treatment Protocol for Insects, Diseases and Fertilization

Distance (Feet) from Trunk to the end of the Branches	Square Footage	Pounds of Palm Fertilizer Needed	Ounces in a measuring cup needed
3	28.3	0.6	9
4	50.3	1.0	16
5	78.5	1.6	25
6	113.1	2.3	36
7	153.9	3.1	49
8	201.1	4.0	64
9	254.5	5.1	81
10	314.2	6.3	101
11	380.1	7.6	122
12	452.4	9.0	145
13	530.9	10.6	170
14	615.8	12.3	197
15	706.9	14.1	226

- A palm with leaves extending 3 feet from the trunk would require about ½ pound of fertilizer (8 ounces in a measuring cup).
- A palm with leaves extending 6 feet from the trunk would require about 2 pounds of fertilizer (32 ounces in a measuring cup).
- A palm with leaves extending 10 feet from the trunk would require about 6 pounds of fertilizer (3 – 32 ounce measuring cups)

When palms reach a size over 15 feet, treatment for foliage pests via liquid application becomes impractical. At this point, our Injection programs are to be utilized.

Palm Fertilization **Only**

Some customers may want us to only fertilize their palms or the palms may be too tall to perform a foliage spray. Our 8-2-12 or (8-0-12 in areas where phosphorus applications are not allowed by ordinance) special palm fertilizer is used.

Note: Some people believe that “deep root feeding” is an effective means of fertilizing larger trees and palms. However, the primary root system of an established tree or palm is typically in the top 8 to 12 inches of soil and extends well beyond the dripline of the plant. Thus, putting fertilizer deep into a few holes around the plant places the fertilizer below a lot of the root system where it has no benefit and does not contact a large percentage of root system. Scattering fertilizer evenly from the trunk of to the dripline and beyond is the most effective means of getting fertilizer to a greater percentage of root system.

Use the application procedure on the previous page for fertilizing larger palms. The charge for fertilization only is $80 minimum per treatment or $20 per palm per treatment, whichever is greater. This treatment is performed every 4 months (3 times per year).

Mid-Sized Palm Treatment Protocol for Insects, Diseases and Fertilization

The following treatment can be performed for those who insist on a liquid “deep root” feeding of palms or trees. Use 1 pound of Lesco’s MacroN 23-0-23 and 2 ounces of Roots 1, 2, 3 per 10 gallons of water.

- A palm with leaves extending 3 feet from the trunk would require about 3 gallons of mix.
- A palm with leaves extending 6 feet from the trunk would require about 10 gallons of mix.
- A palm with leaves extending 10 feet from the trunk would require about 30 gallons of mix.

The charge is $80 minimum per treatment or $20 per palm per treatment, whichever is greater. This treatment is performed every 4 months (3 times per year).

If the palms are greater than 15 feet in height or in an area where spray techniques are not appropriate, our Specimen Palm Injection Service would need to be utilized. The Specimen Palm Injection service is a quarterly program to provide insect, disease and fertilization needs. See the Specimen Palm Injection Protocol for complete details.

Palm and Tree Injection for Insect Control (excluding Caterpillars, Palm Leaf Skeletonizers and Spider Mites)

The Arborjet Injection System is used for the control of Invasive Whitefly, Royal Palm Bug, Scales (including Tuliptree Scale) and Palm Bud Weevil in palms and non-fruit bearing trees over 6 inches diameter at chest height. The program is a yearly service, performed every six months and has a full retreatment guarantee. Only those individuals who have been fully trained in the Arborjet System may deliver this treatment.

Arborjet tree injection is performed by drilling a small hole(s) into the trunk of the tree and inserting a plug that acts as a one-way valve. A needle is then inserted into the plug and the insect control material containing Imidacloprid (Ima-jet) is injected into the vascular system of the palm or tree. Most palms can be treated with one injection site. Hardwood and conifer trees are treated using multiple injection sites on or above the root flairs. The same injection site is to be used as long as it will accept the material.

Note: Imidacloprid does not control caterpillars, palm leaf skeletonizers or spider mites.

The rate of application for Ima-jet is 5 milliliters per inch of trunk diameter at chest height for the first application and 2.5 milliliters per inch of trunk diameter at chest height for all subsequent applications. See the label for complete directions.

Pricing for each treatment is determined by measuring the diameter of the trunk at chest height and multiplying this measurement by $7. Minimum price per visit is $50.

Example: 5 trees with a trunk diameter of 10 inches each would be a total of 50 inches times $7 = $350 per treatment. Treatments are performed twice a year for a total of $700 per year.

The Specialty Treatment Agreement is used to document the sale of these services. The cost of the first treatment is written in the box corresponding with the current month and the “Palm/Tree Injection for Insect Control” row of the agreement. The cost of the second treatment is written on the same row and in the column corresponding with the month 6 months following the first treatment.

The number and type of trees to be treated must be documented on a graph of the property to indicate the location of the palms or trees.

Production commission is paid at 5%.

Services sold are put into the customer database system using the Tree Injection 2x Year Program. The Tree Injection Initial and Tree Injection Service Events are used. The Job Instructions must specify, “Insect Control Only” and the number and type of the trees.

GREENUP SERVICE PROTOCOLS

Palm and Tree Injection for Invasive Whitefly, Royal Palm Bug, Scales and Palm Bud Weevil

The Arborjet Injection System is used for the control of Invasive Whitefly, Royal Palm Bug, Scales and Palm Bud Weevil in palms and non-fruit bearing trees over 6 inches diameter at chest height. The program is a yearly service, performed every six months using the Arborjet injection system. Only those individuals who have been fully trained in the Arborjet System may deliver this treatment.

Arborjet tree injection is performed by drilling small hole(s) into the trunk of the tree and inserting a plug that acts as a one-way valve. A needle is then inserted into the plug and the insect control material containing Imidacloprid is injected into the vascular system of the palm or tree. Most palms can be treated with one injection site. Hardwood and conifer trees are treated using multiple injection sites on or above the root flairs. The same injection site is to be used as long as it will accept the material.

Our treatments for the above listed pests consist of direct trunk injection treatments performed twice a year and have a full retreatment guarantee.

The rate of application for Ima-jet is 5 milliliters per inch of trunk diameter at chest height for the first application and 2.5 milliliters per inch of trunk diameter at chest height for all subsequent applications. See the label for complete directions.

Pricing for each treatment is determined by measuring the diameter of the trunk at chest height and multiplying this measurement by $7.

Example: 5 trees with a trunk diameter of 10 inches each would be a total of 50 inches times $7 = $350 per treatment. Treatments are performed twice a year for a total of $700 per year.

The Special Landscape Service Agreement is used to document the sale of these services. The cost of the first treatment is written in the box corresponding with the current month and the type of service being performed. The cost of the second treatment is written on the same row and in the column corresponding with the month 6 months following the first treatment.

The number and type of trees to be treated must be documented on a graph of the property to indicate the location of the palms or trees.

Production commission is paid at 5%.

Specimen Palm Quarterly Injection Program

The Specimen Palm Injection Program is a yearly service, performed on a quarterly basis using the Arborjet injection system, to provide insect protection and control, disease prevention and fertilization for specimen palms with a trunk diameter 6 inches or greater at chest height. Only those individuals who have been fully trained in the Arborjet System may deliver this treatment.

Arborjet tree injection is performed by drilling a small hole(s) into the trunk of the tree and inserting a plug that acts as a one-way valve. A needle is then inserted into the plug and the insect control, disease prevention or fertilization material is injected into the vascular system of the palm. Most palms can be treated with one injection site. The same injection site is to be used as long as it will accept the material.

Our treatments have a full retreatment and satisfaction guarantee.

- Treatment for disease prevention is performed in December, January or February using Phospho-jet. Dilute Phospho-jet at one part Phospho-jet to 2 parts distilled water and apply the diluted material at 5 milliliters per inch of trunk diameter.
- Treatment for Palm Bud Weevil and piercing-sucking insect control is performed in March, April or May using Ima-jet (undiluted) at a rate of 5 milliliters per inch of trunk diameter. This full rate is used each year since the treatment only once per year.
- Treatment for palm leaf skeletonizers is performed in June, July or August using Ace-jet. Mix Ace-jet at one 15 gram packet per 100 milliliters of water and inject at 5 milliliters per inch of trunk diameter. Notice that protective eyewear is a PPE requirement.
- Nutritional treatment is performed in September, October or November using Palm-jet MG. Mix one part Palm-jet to 3 parts water and inject at label rates.

Initial treatments are performed using the product listed above for the month in which the first treatment is sold. If a problem or concern exists at the time of initial service and that problem is not addressed with the treatment scheduled at that time, one additional treatment can be performed during the same visit at no additional charge with one exception being using the two different insecticides at the same time.

Pricing for each treatment is determined by measuring the diameter of the trunk at chest height and multiplying this measurement by $6. Minimum pricing is $50 per visit.

Example: 5 trees with a trunk diameter of 10 inches each would be a total of 50 inches times $6 = $300 per treatment. Treatments are performed four times per year for a total of $1200 per year.

The Specialty Treatment Agreement is used to document the sale of these services. The cost of the first treatment is written in the box corresponding with the current month and the type of service being performed. The costs of the subsequent treatments are written on the same row and in the columns corresponding with the months every 3 months following the first treatment.

Specimen Palm Quarterly Injection Program

The number and type of trees to be treated must be documented on a graph of the property to indicate the location of the palms or trees.

Production commission is paid at 5%.

Services sold are put into the customer database system using the Tree Injection Qtrly Program. The Tree Injection Initial and Tree Injection Service Events are used. The Job Instructions must specify, “Specimen Palm Program” and the number and type of trees.

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 with 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.

GREENUP SERVICE PROTOCOLS

Imidacloprid Root Drench for Mid-Sized Trees

This treatment is for the prevention or control of soft scales, aphids, white flies or thrips on mid-sized non-fruit bearing trees that are too large to spray due to excessive drift, but too small to inject with the Arborjet system (under 6 inches in diameter at chest height) . It is not effective against caterpillars or spider mites.

Mix Rate: 0.2 oz per gallon of water (2 oz of Criterion per 10 gallons).
Amount of Mix Needed: 1 gallon of mix per inch of trunk Diameter at Breast Height (DBH).

Application Directions:

- Determine the amount of time in seconds to apply 1 gallon of mix from the shrub tank using the lawn spray wand. Use a 5 gallon bucket; find the amount of time in seconds to fill to 5 gallons. Divide the number of seconds needed by 5. A different container size can be used if needed. Divide the amount of time (in seconds) needed to fill the container by the number of gallons applied in the container.
- Measure the diameter of the trunk(s) at breast height and determine the amount of mix needed to perform the treatment. Example: 4 trees at 5 inches DBH each will need 20 gallons of mix total.
- Create the mixture needed – 1 gallon of water for every inch of DBH and 0.2 ounces of Criterion for every gallon of water. Mix and circulate through the hose.
- Apply the drench mixture evenly from the trunk to 3 foot past the drip-line
    - Un-established trees will still need the total amount of mix determined by the DBH applied over the area to which the roots have established.
    - Trees in an area where you cannot treat up to 3 feet past the dripline due to concrete or other obstruction will need the total amount of mix needed for the DBH applied over the area available to treat.

Example 1: A tree of 4 inches DBH –

- Mix needed- 4” (DBH) x 1 (gallons per inch) Need 4 gallons of mix
- Criterion needed in Mix – 0.2 oz Criterion per gallon x 4 (DBH) = 0.8 oz of Criterion
- Amount of Time to Apply - If the truck is calibrated at 5 gallons per minute, 1 gallon is applied in 12 seconds (60 divided by 5 = 12). 4 gallons of mix needs to be applied so 4 (gallons) x 12 (Seconds per Gallon) = 48 seconds for the tree.

Example 2: 2 trees of 5 inches DBH each–

- Mix needed- 10” (DBH total) x 1 (gallons per inch) Need 10 gallons of mix
- Criterion needed in Mix – 0.2 oz Criterion per gallon x 10 (DBH) = 2.0 oz of Criterion
- Amount of Time to Apply - If the truck is calibrated at 5 gallons per minute, 1 gallon is applied in 12 seconds (60 divided by 5 = 12). 5 gallons of mix needs to be applied per tree so 5 (gallons) x 12 (Seconds per Gallon) = 60 seconds for each tree.

Pricing: The charge to the customer is a minimum charge of $45 or $2 per inch of DBH (accumulative for all trees being treated), whichever is greater.
Translocation may take up to 6 weeks. Results are expected in 4 to 6 weeks. There is no guarantee for this treatment. We cannot guarantee to save the life of an infested tree. Keep in mind that if pest populations are very high, a substantial amount of damage can be done without the tree showing that it is about to die and more damage will be done by the time the product is distributed through the vascular system of the tree.

Revised 6-13 jw

Tree Care Rate Card

Yearly Programs Written on the Specialty Treatment Agreement (Yearly Agreement)

Service	Description	Charge per Service	Service Frequency
Invasive Whitefly Quarterly Root Drench and Foliage Spray for Shrubbery and Small Trees	Quarterly root drench with Imidacloprid and foliage spray with Forbid	Minimum of $50 or $2.50 per 100 sq. ft. of bed area per foot of shrub height. (Length x Width x Height divided by 100 x $2.5)	4 x per Year
Mid-Sized Tree Quarterly Root Drench for Insect Control and Protection	Quarterly root drench with Imidacloprid for Piercing Sucking Insects	Minimum charge of $50 or $2 per inch of DBH (accumulative for all trees being treated), whichever is greater.	4 x per Year
Specimen Palm Injection Service	Quarterly injection treatments to manage the most common insect, disease and nutritional concerns throughout the year.	Minimum charge of $50 or $6 per inch of trunk diameter at chest height	4 x per Year
Control of Piercing-Sucking Insects in Palms or Trees	Injection Treatments performed twice a year for Invasive Whitefly, Royal Palm Bug, Scales and other Piercing-Sucking Insects.	Minimum charge of $50 or $7 per inch of trunk diameter at chest height	2 x per Year
Redbay Ambrosia Beetle Prevention	Yearly Disease prevention performed via injection	$10 per inch of trunk diameter at chest height	1x per Year
	Insect prevention via trunk spray	Minimum charge of $50 or $2 per inch of trunk diameter at chest height	4x per Year
Insect Control and Fertilization for Edible Fruit Trees with trunk diameter less than 6 inches at chest height	Bi-Monthly foliar insect control applications with 3 x per year fertilization spring - fall	Minimum charge of $50 or $20 per tree, whichever is greater	6x per Year
Insect Control and Fertilization for Edible Fruit Trees with trunk diameter greater than 6 inches at chest height	Quarterly injection treatments to manage the most common insect concerns with 3 x per year fertilization spring - fall	Minimum charge of $50 or $10 per inch of trunk diameter at chest height	4 x per Year

One-Time Services -Written on the Special Service Agreement

There are times where a One-Time Service may make sense for a particular problem or a particular customer situation. However, be aware of the differences in pricing and ensure that the service is written on the "Special Services Agreement" and not a yearly agreement. There are no guarantees for "One-Time Services"

Caterpillar or other Chewing Insect Control	One-Time Injection using Acejet for non-fruit bearing trees or AzaSol for edible fruits or nuts	Minimum charge of $50 or $10 per inch of trunk diameter at chest height	N/A
Sycamore Lacebug or other Piercing-Sucking Insect Control	One-Time Injection using Ima-jet	Minimum charge of $50 or $10 per inch of trunk diameter at chest height	N/A
Broad Spectrum Disease Control	One-Time Injection using Phospho-jet	Minimum charge of $50 or $6 per inch of trunk diameter at chest height	N/A
Palm or Tree Fertilization	One-Time Injection using Palm-jet MG	Minimum charge of $50 or $6 per inch of trunk diameter at chest height	N/A

WEEKLY TRAINING SESSION

Landscape Services - Sales and Agreement

Topic Category: Lawn

Recordable Verifiable Training Hours: 1.0

Objectives: This lesson is designed to provide information regarding Service and Sales of our GreenUP Landscape Services.

Length of lesson: Approximately 60 minutes.

Materials needed:

- Training Guideline
- Copies of the Landscape Service Agreement for all Team Members attending.
- GreenUP Protocol - Landscape Services – Sales and Agreement
- 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 Record Form (VTRF)
- Distribute and review the GreenUP Protocol - Landscape Services – Sales and Agreement
    - 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 Sessions through Massey University.

WEEKLY TRAINING SESSION

Landscape Services - Sales and Agreement

Name _____ Date _____

PRE & POST TEST

1. T or F Setting the proper expectations at the time of sale is a very important part of building long-term trusting relationships with our customers.

2. T or F Our Landscape Service Agreement has been revised for the purpose of limiting our level of liability.

3. T or F When filling out a service agreement, we should always ask for the customer's email address.

4. T or F We have the ability to provide any customer with a beautiful landscape regardless of the initial condition of the plant material and regardless of the watering, mowing and pruning practices.

5. T or F Our Bi-Monthly Lawn Care service provides the customer with an insect replacement guarantee.

6. T or F Our Monthly Landscape Service provides the customer with a plant replacement guarantee for loss of plant material regardless of cause.

7. T or F Asiatic Jasmine ground cover is included in our shrub care service.

8. T or F Oak Trees that have a trunk diameter of 3 inches at chest height are included in our shrub care service.

9. T or F All Lawn Care Sales regardless of Monthly Landscape, Landscape or Every Other Month begins with an Initial Service followed by a Regular Service and Aeration the following month.

10. T or F A neutral soil pH (7.0) is typically too high for Zoysia, Bahia and Centipede and must be adjusted. Without providing the pH adjustment, we will not get optimal results and the customer will not receive the desired result. The GreenUP Protocol Soil pH must be followed in its entirety.

WEEKLY TRAINING SESSION

Landscape Services - Sales and Agreement

PRE & POST TEST ANSWER KEY

1. T or F — Setting the proper expectations at the time of sale is a very important part of building long-term trusting relationships with our customers.

2. T or F — Our Landscape Service Agreement has been revised for the purpose of limiting our level of liability.

3. T or F — When filling out a service agreement, we should always ask for the customer's email address.

4. T or F — We have the ability to provide any customer with a beautiful landscape regardless of the initial condition of the plant material and regardless of the watering, mowing and pruning practices.

5. T or F — Our Bi-Monthly Lawn Care service provides the customer with an insect replacement guarantee.

6. T or F — Our Monthly Landscape Service provides the customer with a plant replacement guarantee for loss of plant material regardless of cause.

7. T or F — Asiatic Jasmine ground cover is included in our shrub care service.

8. T or F — Oak Trees that have a trunk diameter of 3 inches at chest height are included in our shrub care service.

9. T or F — All Lawn Care Sales regardless of Monthly Landscape, Landscape or Every Other Month begins with an Initial Service followed by a Regular Service and Aeration the following month.

10. T or F — A neutral soil pH (7.0) is typically too high for Zoysia, Bahia and Centipede and must be adjusted. Without providing the pH adjustment, we will not get optimal results and the customer will not receive the desired result. The GreenUP Protocol Soil pH must be followed in its entirety.

GreenUP Service Protocol

Landscape Services – Sales and Service Agreement

One of the key points in our Mission Statement is, "building long-term trusting relationships with our customers". An important aspect of achieving this part of our mission is to clearly identify what is included with our service and what is included in our guarantees. The customer interaction at the time the initial agreement is set is particularly important. Success in building a long-term trusting relationship with our customer is reliant on setting the proper expectations at the time of sale and getting off to a great start by "wowing" our customer with our initial and regular services.

When a customer purchases our Monthly Landscape Service, Landscape, Bi-Monthly Lawn or Shrub Service, they rightfully expect that we can achieve the goal of enhancing the beauty of their property. But to do this, we will need a proper foundation from which to work. This foundation continues to be our 5 key principles of plant management. (1) Right plant in the right place and a sufficient amount of turf to work with. We will also need (3) proper watering, (2) healthy soils including proper soil pH and (4) proper cultural practices including mowing, pruning, proper planting and mulching. When these Key Principles are in line, the 5th key principle of controlling pests becomes fairly simple. Without these fundamental principles being in place, we will have a very difficult time satisfying the customer.

Monthly Landscape Service: Our Monthly Landscape Service should always be the first and primary service offered to a customer. <u>This is our premium service and is the only service we offer that includes a plant replacement guarantee.</u>

The first two months of our service (Monthly Landscape or Bi-Monthly Lawn Care) are designed to provide intensive care to the turf in order to quickly get the lawn up to Massey Standards and our customer's expectations. The initial service, the first regular service, and the core aeration service are all provided within the first 60 days of a customer starting service with us. Our Agronomic Program is designed with providing our service in this manner. The Initial Service and the first Regular Service being done the following month work in conjunction to provide the WOW factor we are looking for.

Within the first two months of our service, the customer will receive:

- Two nutritional applications about 30 days apart to spoon feed their lawn and develop a healthy green color.
    - These two feedings quickly increase root mass and shoot density.
- Two post-emergent weed control applications as needed to control existing broadleaf weeds.
- One broadcast pre-emergent weed control application to prevent future weeds from emerging.
- One or two broadcast insect control applications depending on the time of year.
- Disease control as needed to control existing turf disease
- Aeration of the turf to:
    - Provide oxygen for the root system.
    - Reduce nutrient and water runoff
    - Enhance water penetration
    - Increase the activity of beneficial soil micro-organisms
    - Speed up the decomposition of decaying organic matter

- An additional application of a potassium and magnesium source or Granular Sulfur provided at the time of aeration to create a hardier and stronger turf or to reduce the soil pH to allow for better utilization of nutrients.

It is crucial that we understand the importance and benefits of these first two months of service and that we convey the importance and benefits of these first two months of service to our new customer. This is just one of the many things we do that set us apart from the competition.

The charges to the customer for the Monthly Landscape Service are based on the Initial Service Charge, which includes a Lawn Care Service and a Shrub Care Service followed by 11 *Monthly* Service Charges. The charges to the customer for the Bi-Monthly Lawn Service are based on the Initial Service Charge and 6 *Bi-Monthly* Charges. Our Aeration Service is built into the monthly or bi-monthly service charges, so the customer does not see an extra charge for this service. **It is imperative that the Rate Card and the Worksheet on the back of the rate card be used to compute these charges properly and so our Specialists are paid the proper Production Value for the work they perform.**

All Landscape or Lawn Care sales must begin with a sampling of the soil pH at the time of initial inspection. All Inspectors must be equipped with a color metric pH sample kit. The soil pH must be documented accurately on the Landscape Analysis document. Proper soil pH for the particular plant species is required for optimal plant health and for the nutrients we apply to work properly. Optimal soil pH range for St. Augustine or Bermuda turf is between 6.0 and 6.8; Zoysia between 5.5 and 6.5; and for Bahia or Centipede between 5.0 and 6.0.

Plant health, growth and color is greatly affected by soil pH. As an example: Zoysia, Bahia and Centipede are particularly sensitive to high soil pH. A neutral soil pH (7.0) is typically too high for Zoysia, Bahia and Centipede and must be adjusted. Without providing the pH adjustment, we will not get optimal results and the customer will not receive the desired result. The GreenUP Protocol Soil pH must be followed in its entirety.

When pH adjustments are required to raise or lower the soil pH, the appropriate charges must be applied to the initial service according to the Rate Card Worksheet.

In both the Monthly Landscape Service and Bi-Monthly Lawn or Shrub Service sections of our Service Agreement, there are spaces provided to identify the areas of damaged lawn or shrubs that need to be replaced by the customer. When our lawn care services are initiated, it is common to have areas of turf or shrubs that will need to be replaced in order to provide the customer with the results they expect. It is likely that large areas of damaged turf will fill in with weeds before a quality turf cover can be established from the existing turf. Many of these weeds will have no selective means of control. The quickest and most sure way to satisfy a new lawn customer with large areas of damaged turf is to identify the areas that need to be replaced and sell them our renovation service. Document on the agreement the square footage of the lawn or shrubs that need to be replaced and identify the location of these areas on the inspection graph and renovation agreement.

GreenUP Service Protocol

Landscape Services – Sales and Service Agreement

Proper irrigation is fundamental to providing the customer with the results they expect. Every initial inspection for the sale of Landscape or Lawn Care services must begin with an inspection of the irrigation system. It is mutually beneficial for our company to provide our customer with irrigation maintenance.

In the top section of our service agreement is the customer contact information. Always ask for the customer's email address. Having the customer's email address allows us to provide them with service alerts, new service information and special promotions. Almost everyone has an email address and it is to our mutual benefit to be able to contact the customer by email. Always ask the customer for their email address. Asking for an email address is as common as asking for a phone number.

Agreement of Services and Payment Options: This section provides two areas for the customer to initial. One area is to authorize the services we will perform; check the appropriate box or boxes and have the customer initial. The other area is for the customer to authorize enrollment in Auto Bill Pay. They may pay annually in advance and receive a 5% discount or pay monthly for the Landscape Service or Bi-Monthly for the Lawn Care or Shrub Care Service. Check the appropriate box and have the customer initial. Our preferred method of payment is Electronic Funds Transfer in Monthly or Bi-Monthly payments. Make sure to discuss this with the customer as well and complete the required form.

Method of Payment: Write in the amount remitted with agreement. This should at least be the charge for the initial service. Identify whether the payment is by cash, check, auto bill pay or credit card. If payment is by credit card, identify the type of card, the account number, the expiration date and the authorization number.

At the bottom of the agreement is the area for the customer, inspector and general manager to sign and date. Under the customer's signature, the agreement states that the customer has read the Service Agreement Terms and Conditions on the reverse side.

Reverse Side of the Agreement:
The reverse side of the agreement states that the agreement is for an initial period of twenty-four months. It also states that the customer may cancel the agreement by providing Massey with a thirty day written notice of cancellation.

The Insect Damage Replacement Guarantee is clearly identified as being for "Monthly Landscape Services Only". The guarantee states that Massy Services will replace permanently damaged sod or shrubs that are damaged from: mole crickets, spittlebugs, lawn caterpillars, chinch bugs, aphids, scale, lace bugs, chili thrips and/or mealy bugs. The lawn and/or shrubs will be replaced with similar type plants designed to thrive in the conditions present. This insect damage replacement guarantee does not constitute a warrantee against loss as a result of any new invasive species of landscape insects."

Notice that our replacement guarantee is for *insect damage.* The specific insects covered in the replacement guarantee are listed on the back of the agreement. Please note that the insect damage replacement guarantee does not provide warrantee against any "new invasive species of landscape insects". These new invasive species typically do not have natural means of control and can reach epidemic proportions. When a new invasive pest species occurs, there is often little known about the control or a control may not even exist. We cannot provide a replacement guarantee for a pest that does not have a control method available and

controlling a new invasive species may require treatment over and above the price provided at the time the agreement was initiated. With the goal of "building long-term trusting relationships with our customer" in mind, our agreement sets a clear understanding of our plant replacement guarantee and what shrubs and trees are included in our service.

The Included Services section notes that our "Shrub Care Services include nutritional applications as well as inspection and treatment for plant damaging insects and diseases. Covered plant materials include all woody ornamental shrubs and perennial ground covers. Treatment to trees or palms is limited to palms less than 10 feet in canopy height and non-fruit bearing trees with a trunk diameter less than 4 inches at chest height. Treatments in pool deck areas may be limited due to staining and safety concerns. Weed control in landscape beds, large specimen palm trees, fruit bearing trees, rose gardens and annual flower plantings are not included with shrub care services."

Keep this section in mind when pricing, selling and servicing our Shrub Care Services.

- All "woody ornamental shrubs and perennial ground covers" are included. This means that in addition to all the woody ornamental shrubs, ground covers such as Asiatic Jasmine, English Ivy or Liriope <u>are included</u>. Make sure the square footage of these areas are included in the shrub bed square footage and priced accordingly. Also, make sure we are providing service to these areas.
- "Treatment to trees and palms is limited to palms less than 10 feet in canopy height…" This means that Queen Palms, Roebelenii Palms or others are included with the service provided they are less than 10 feet in canopy height. Again, make sure we are pricing, selling and servicing these palms.
    - These palms are serviced in the same manner as the other plant material, except that our 8-2-12 or 8-0-12 is used for fertilization.
    - Service to these palms ceases when they reach a height of 10 feet.
- This sentence goes on to say, "…and non-fruit bearing trees with a trunk diameter less than 4 inches at chest height." This means that small oak trees, for example, would be included with the service until the trunk diameter is 4 inches or greater at chest height.
- Treatment in pool deck areas may be limited due to staining and safety concerns. Some plantings in pool deck areas pose great risks when trying to provide service. For example, the foliage of small palms or other plants hanging over the pool cannot be sprayed. Many nutrients may cause damage to the pool deck surface. Limited treatment will be performed provided we can safely perform the treatments.
- Weed control in landscape beds, large specimen palm trees, fruit bearing trees, rose gardens and annual flower plantings are <u>not</u> included with shrub care services.
- To provide a few points of clarification:
    - Canary Island Date palms are "specimen palm trees" they are not included with the standard shrub care service even if they are less than 10 feet tall. We do offer Palm Care Services to provide care for these trees. See our Tree Care Rate Card.
    - Citrus trees are fruit bearing trees; they are not included in the shrub care service even if they are very small. We also offer Edible Fruit Tree Services to provide care for these trees. See our Tree Care Rate Card.

Landscape Services – Sales and Service Agreement

- Rose gardens are not included. What we are referring to here is large plantings of hybrid roses. These types of rose gardens require constant care and typically weekly treatments for disease, insects or nutrients. We do include treatment and care for Knockout Roses.
- Annual flower plantings are not included. These types of plantings are changed out seasonally.

The next paragraph on the back of the agreement serves to provide the customer with the proper expectation of what our service can and cannot do and the importance of their active cooperation. Sales presentations must be made with this information in mind. Do not overstate what is possible to do with our service. We cannot build "long-term trusting relationships" if the sales presentation does not state the facts accurately. Misstating the facts of what we can do or not do with our service is not only dis-honest, it is not necessary. Our service has great benefits to the customer and is a great value. It is not necessary or beneficial to overstate what can be done in order to sell the service. This paragraph reads as follows:
The lawn and shrub services provided by Massey do not constitute a warranty or guarantee against all possible losses of plant material. We require your active cooperation in partnership with us by following our cultural recommendations for mowing, pruning and watering. Insects, weeds and diseases routinely occur in a landscape and some of these cannot be prevented. The insect damage replacement guarantee covers those specifically listed pests that can be prevented and or controlled in the landscape. While we cannot offer a replacement guarantee for uncontrollable weeds or disease causing fungi or bacteria, our service does provide curative treatments for common weeds and disease at no additional charge. Weed control in the lawn is an ongoing and dynamic process. We cannot prevent the encroachment of all weeds; however, we do provide preventive and curative treatments that suppress numerous types of weeds. Some types of uncontrollable weeds (such as Crabgrass, Alexandergrass, Bermudagrass and/or Torpedograss) may require an additional chargeable service such as renovation to remove them from the lawn.

The remainder of the back of the agreement provides Auto Bill Pay Terms and Conditions and our Privacy Policy for Email Addresses.

WEEKLY TRAINING SESSION

Spring Dead Spot

Topic Category: Lawn
Recordable Verifiable Training Hours: 0.5

Objectives: This lesson is designed to teach the basics of Spring Dead Spot biology and management.

Length of lesson: Approximately 30 minutes.

Materials needed:

- GreenUP Protocol Spring Dead Spot – on the G: Drive Shared\GreenUp Reference Materials\GreenUp Protocols\Individual Protocols\Lawn Damaging Diseases
- Pre- and Post- tests.

Training Guidelines:

- Make copies of the tests and training materials (GreenUP Protocol Spring Dead Spot) 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 training materials on SDS.
    - 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 VTM's through Massey University

WEEKLY TRAINING SESSION

Spring Dead Spot

Pre and Post Test

1. Spring Dead Spot is caused by a
   a. Bacteria
   b. Fungus
   c. Virus
   d. Aphids

2. Describe the symptoms of SDS _____

3. The organism(s) causing SDS are active when conditions are:
   a. Moist with soil temperatures below 50 degrees
   b. Dry with soil temperatures over 80 degrees
   c. Moist with soil temperatures between 60 and 80 degrees
   d. Dry with soil temperatures below 80 degrees

4. The best control measure is always_____.

5. What grass type is most likely to be infected?
   a. Tall Fescue
   b. Bermuda
   c. Zoysia
   d. Any of the above

6. T or F Spring Dead Spot will result in dead patches of turf.

7. At what time of year is fungicide treatment provided for SDS? _____

8. How much area of turf should be covered with one pound of Pillar G?
   _____

9. T or F Turf that was infected last year will most likely be re-infected this year.

10. What is the application rate *per 1000 sq. ft.* of Pillar G when treating Brown Patch?____

11. What is the spreader setting using the Lesco Calibration tool for Pillar G?
    _____

WEEKLY TRAINING SESSION

Spring Dead Spot

Pre and Post Test Answers

1. Spring Dead Spot Patch is caused by a
   a. Bacteria
   b. Fungus
   c. Virus
   d. Aphid

2. Describe the symptoms of brown patch. **well-defined circular patches of dead, bleached-out grass noticed during spring green up.**

3. The organism(s) causing SDS are active when conditions are:
   a. Moist with soil temperatures below 50degrees
   b. Dry with soil temperatures over 80 degrees
   c. Moist with soil temperatures between 60 and 80 degrees
   d. Dry with soil temperatures below 80 degrees

4. The best control measure is always **cultural**.

5. What grass type is likely to be infected?
   a. Tall Fescue
   b. Bermuda
   c. Zoysia
   d. Any of the above

6. T or F Spring Dead Spot will result in dead patches of turf.

7. At what time of year is fungicide treatment provided for SDS? **Fall**.

8. How much area of turf should be covered with one pound of Pillar G? **About 333 sq. ft.**

9. T or F Turf that was infected last year will most likely be re-infected this year.

10. What is the application rate *per 1000 sq. ft.* of Pillar G when treating Spring Dead Spot?
    3 pounds

11. What is the spreader setting using the Lesco Calibration tool for Pillar G?
    10

Spring Dead Spot

Spring dead spot (SDS) is a persistent and destructive disease of Bermudagrass (*Cynodon* sp.) in Georgia. The disease is particularly prevalent and damaging in north Georgia. However, SDS can be observed throughout the state after harsh winters and in areas where Bermudagrass has been exposed to freezing temperatures for extended periods of time. The disease has also been observed in Zoysiagrass, although less frequently.

Pathogen

Ophiosphaerella korrae is the causal agent of SDS in the Southeast US. Gaeumannomyces graminis var. graminis is also suspected to be associated. These fungi are active in the fall and spring when cool, moist conditions exist. They do not kill Bermudagrass directly; instead, they make turfgrass more susceptible to cold and freezing injury by feeding on roots, rhizomes and stolons. Spread of these fungi primarily occurs through movement of infected plants or infested soil by equipment, people, animals and running water.

Symptoms

As turfgrass “greens up,” in the spring, well-defined circular patches of dead, bleached-out grass are noticeable in the affected areas. Non-infected Bermudagrass resumes growth, accentuating the infected areas. Roots, rhizomes and stolons are sparse and dark-colored (necrotic). Leaves become bleached, gray and straw-colored. It is likely that various weed species will invade the areas, due to the lack of turf competition.

Recovery from the disease is slow. Because the turfgrass in affected patches is dead, the primary means of recovery occurs by spread of rhizomes and stolons into the patch. Because recovery is dependent on lateral fill in of the surrounding turf, symptoms can remain visible well into the growing season. Turf replacement would be the quickest means of recovery.

Spring Dead Spot

Conducive Conditions

Infection of the turfgrass begins when soil temperatures are less than 70 °F. Typically, in Georgia, infection of susceptible grasses begins in late September or early October and will continue as long as soil temperatures are above 50° F. Fungal growth and plant infection can resume at these temperatures in early spring, coinciding with bermudagrass transitioning from winter dormancy.

Control

In order for any disease to worsen and spread, it needs three things:

- The Pathogen
- The Host
- The Conducive Condition

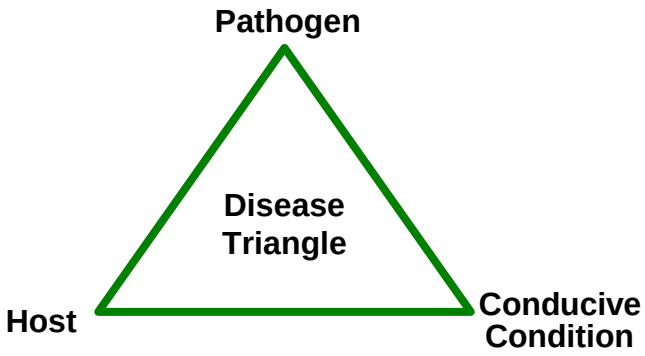
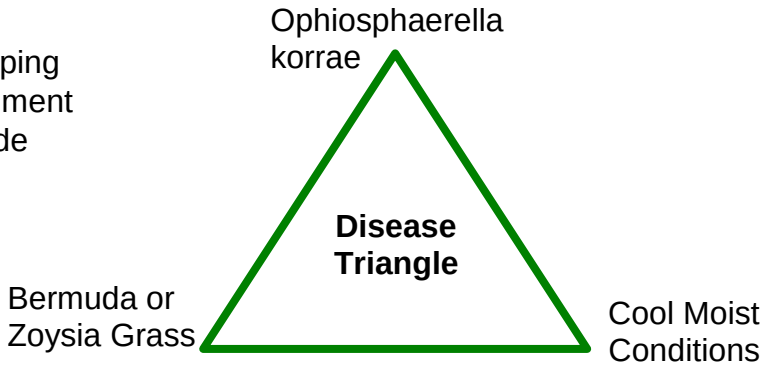


Figure 3. Disease Triangle

The removal of any one of these three will result in the control of the disease. The Disease Triangle for Spring Dead Spot is represented below. Control can be achieved by:

- Replacing with landscaping
- Changes in the environment
- Application of a fungicide



Disease Triangle for SDS

Cultural control for plant disease is always the best method. However, cool moist conditions are prevalent in North Georgia in the fall. The only condition we may be able to control would be irrigation and only watering when soil begins to dry slightly.

Spring Dead Spot

A more severe cultural control method would be the removal of the host plant and replacing it with a landscaping plant (i.e. tree or shrub) or other ground cover. This is rarely an option but remember it is an option!

Without chemical control, it is likely that a turf area affected by SDS will show its affects every spring and the affected areas are likely to spread and increase in size.
When SDS is identified, the customer's account should be noted so fungicide treatment can be performed each fall when soil temperatures are between 60 and 80 degrees. Control via a fungicide is achieved by making applications of either Pillar G or Headway G from a handheld or rotary push spreader.

Pillar and Headway G are granular systemic fungicides, but with different active ingredients. Both products are different combinations of two highly effective active ingredients. Both products travel upward with the water flow system (xylem) of the plant. A light watering will be necessary in order to activate the material so it can be taken up by the plant. The required PPE for Headway G and Pillar G is long sleeved shirt, long pants, waterproof gloves, and shoes with socks. Eye protection is also required PPE for Pillar G. Pillar G and Headway G can be a little dusty. A particulate respirator (dust mask) is not required by the label, but may be beneficial.

The application rate for each product is 3 pounds per 1000 sq. ft. of turf. When the turf areas affected are 1000 sq. ft. or larger, a Lesco rotary spreader is used. Calibrate the spreader to setting 10 with the Lesco calibration tool. A hand spreader can be used to treat areas smaller than 1000 sq. ft. of turf. The Scott's hand spreader should be set on #3. Walk at the standard walking speed as you treat the area. One pound of material looks like 22 ounces in a measuring cup. One pound of material should cover 333 sq. ft. of turf.

One application of either of these fungicides applied in the fall should provide control of Spring Dead Spot for the following spring.

MASSEY
GreenUP Landscape Services

GREENUP SERVICE PROTOCOLS

Shot Hole Disease

Shot Hole Disease is a common problem on a number of ornamental shrubs and trees, but particularly on Laurel species.

The causal organisms are a combination of bacteria (Xanthomonas prunii) and fungal diseases (Blumeriella gaapi and/or Cercospora sp.)

Symptoms appear as circular holes in the leaves that eventually join and make larger holes. The appearance of shooting a shotgun at the shrub and causing multiple holes. Leaves appear to be 'eaten' away by the disease, leaving a ragged appearance. As leaves are damaged, they begin to fall away, the plant loses its ability to make food and can become stressed.

The primary time of activity is April through October, with peak activity in May and September. It is important to note that the affected leaves do not "heal". The only way to change the appearance of the plant is to protect the new growth from infestation while stimulating new growth until the damage is covered.

Control – It is important to recognize that this disease is a combination of bacteria and fungus. Kalmor (Kocide 3000) is a bactericide and fungicide and will do an excellent job on this disease. Sanitation is also important to keep the disease from coming back. Clean up contaminated leaves from under the plant. When diseased leaves build-up under the plant, rain or watering can splash the disease back up on the plant. Apply additional fertilizer if needed to stimulate new growth.

WEEKLY TRAINING SESSION

Spring Dead Spot

Topic Category: Lawn
Recordable Verifiable Training Hours: 0.5

Objectives: This lesson is designed to teach the basics of Spring Dead Spot biology and management.

Length of lesson: Approximately 30 minutes.

Materials needed:

- GreenUP Protocol Spring Dead Spot – on the G: Drive Shared\GreenUp Reference Materials\GreenUp Protocols\Individual Protocols\Lawn Damaging Diseases
- Pre- and Post- tests.

Training Guidelines:

- Make copies of the tests and training materials (GreenUP Protocol Spring Dead Spot) 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 training materials on SDS.
    - 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 VTM's through Massey University

WEEKLY TRAINING SESSION

Spring Dead Spot

Pre and Post Test

1. Spring Dead Spot is caused by a
   a. Bacteria
   b. Fungus
   c. Virus
   d. Aphids

2. Describe the symptoms of SDS _____

3. The organism(s) causing SDS are active when conditions are:
   a. Moist with soil temperatures below 50 degrees
   b. Dry with soil temperatures over 80 degrees
   c. Moist with soil temperatures between 60 and 80 degrees
   d. Dry with soil temperatures below 80 degrees

4. The best control measure is always_____.

5. What grass type is most likely to be infected?
   a. Tall Fescue
   b. Bermuda
   c. Zoysia
   d. Any of the above

6. T or F Spring Dead Spot will result in dead patches of turf.

7. At what time of year is fungicide treatment provided for SDS? _____

8. How much area of turf should be covered with one pound of Pillar G?
   _____

9. T or F Turf that was infected last year will most likely be re-infected this year.

10. What is the application rate *per 1000 sq. ft.* of Pillar G when treating Brown Patch?____

11. What is the spreader setting using the Lesco Calibration tool for Pillar G?
    _____

WEEKLY TRAINING SESSION

Spring Dead Spot

Pre and Post Test Answers

1. Spring Dead Spot Patch is caused by a
   a. Bacteria
   b. Fungus
   c. Virus
   d. Aphid

2. Describe the symptoms of brown patch. **well-defined circular patches of dead, bleached-out grass noticed during spring green up.**

3. The organism(s) causing SDS are active when conditions are:
   a. Moist with soil temperatures below 50degrees
   b. Dry with soil temperatures over 80 degrees
   c. Moist with soil temperatures between 60 and 80 degrees
   d. Dry with soil temperatures below 80 degrees

4. The best control measure is always **cultural**.

5. What grass type is likely to be infected?
   a. Tall Fescue
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6. T or F Spring Dead Spot will result in dead patches of turf.

7. At what time of year is fungicide treatment provided for SDS? **Fall**.

8. How much area of turf should be covered with one pound of Pillar G? **About 333 sq. ft.**

9. T or F Turf that was infected last year will most likely be re-infected this year.

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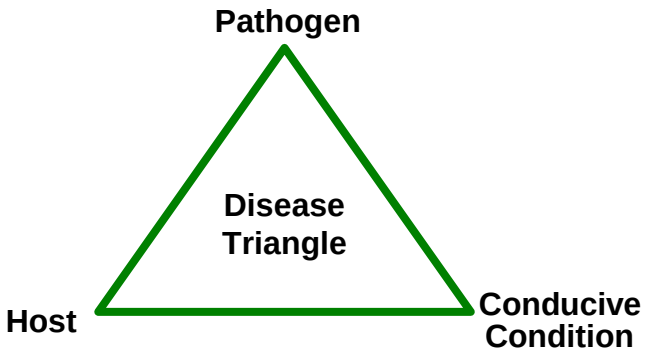

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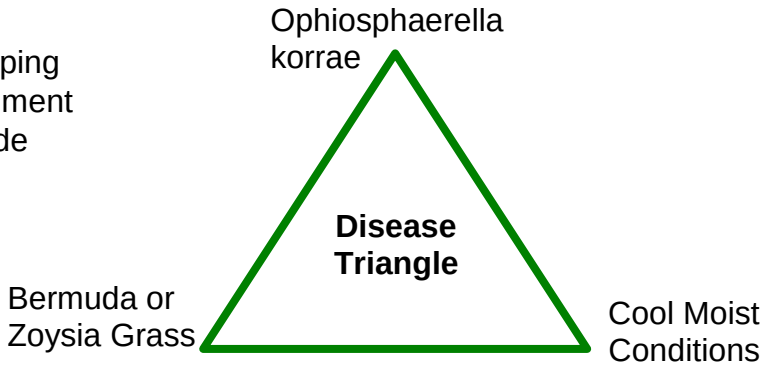

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WEEKLY TRAINING SESSION

Understanding Water, Basic Hydraulics

Understanding Basic Hydraulics in an Irrigation System

As water moves through pipe it creates friction along the interior of the pipe wall. This friction is called "friction loss" or "pressure loss". The amount of water being pushed through the pipe is referred to as GPM or "gallons per minute". An increase in the amount of water that is pushed through a pipe, increases the speed that the water needs to move. This speed is referred to as "velocity". Gallons per minute, velocity, and pressure loss are the three things that dictate how the hydraulics of an irrigation system works.

Irrigation systems are designed around the capabilities of the water source provided. The water source provides the GPM and static water pressure needed to begin designing an irrigation system.

Pipe Pressure Loss and Velocity Charts

Refer to the handout "Friction Loss Charts".

- Class 200 PVC is the most common pipe used in the installation of an irrigation system.
- The shaded areas of the columns are where design statistics should not go.
- There are 2 columns under each pipe size.
- These columns represent the velocity and pressure loss (per 100') for that pipe size.
- To the left is the gallons per minute which dictate the velocity and pressure loss for each pipe size.
- The important number in this chart to pay attention to is the "Velocity". The common denominator is that the velocity should never exceed "5" feet per second. This is the point which water hammer can occur when an electric valve shuts down.
- The working hydraulics of an irrigation system depends on the capacity of the water source, the static water pressure at the water source, and the pipe size throughout the system.

Hydraulic Flow

As soon as an electric valve is activated, pressure loss begins to happen.

- It begins in the service line from the city water main to the residential water meter.
- Then continues through the water meter into the mainline up to the backflow preventer.
- Pressure loss is encountered through the backflow and into the irrigation mainline.
- Continuing through the mainline to the electric valve that has been turned on.
- After experiencing pressure loss through the electric valve, it continues through the lateral line up to the sprinkler.

This is the hydraulic path that water flows and experiences pressure loss along the way.

- You begin with a static water pressure reading. This is at rest.
- The total loss is an accumulation of the loss through each area of the water path.
- The total accumulated pressure loss subtracted from the static water pressure reading is the operating pressure for the sprinkler head. Refer to the nozzles chart to see manufacture recommended operating pressure for that nozzle.

How do we use this information

When we decrease the gallons per minute in a zone, we slow the velocity of the water, decreasing the amount of pressure loss in the system. Allowing more pressure to be used at the sprinkler heads. This gives us better performance from the sprinkler which creates a much more even distribution of water over the given area.

FRICTION LOSS CHARTS - CLASS 200 PVC IPS PLASTIC PIPE

ASTM D2241 (1120, 1220) SDR 21 C = 150 • PSI loss per 100 ft. of pipe

Nominal Size	Class 315: ½"		¾"		1"		1¼"		1½"		2"		2½"		3"		4"		6"	
Avg. ID	0.696		0.910		1.169		1.482		1.700		2.129		2.581		3.146		4.046		5.955	
Pipe OD	0.840		1.050		1.315		1.660		1.900		2.375		2.875		3.500		4.500		6.625	
Avg. Wall	0.072		0.070		0.073		0.089		0.100		0.123		0.147		0.177		0.227		0.335	
Min. Wall	0.062		0.060		0.063		0.079		0.090		0.113		0.137		0.167		0.214		0.316	
Flow (GPM)	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss	Velocity FPS	PSI Loss
1	0.84	0.25	0.49	0.07	0.30	0.02	0.19	0.01	0.14	0.00										
2	1.68	0.90	0.99	0.24	0.60	0.07	0.37	0.02	0.28	0.01	0.18	0.00								
3	2.53	1.90	1.48	0.52	0.90	0.15	0.56	0.05	0.42	0.02	0.27	0.01								
4	3.37	3.24	1.97	0.88	1.19	0.26	0.74	0.08	0.56	0.04	0.36	0.01	0.24	0.01						
5	4.21	4.89	2.46	1.33	1.49	0.39	0.93	0.12	0.71	0.06	0.45	0.02	0.31	0.01						
6	5.05	6.86	2.96	1.86	1.79	0.55	1.11	0.17	0.85	0.09	0.54	0.03	0.37	0.01	0.25	0.00				
7	5.90	9.12	3.45	2.47	2.09	0.73	1.30	0.23	0.99	0.12	0.63	0.04	0.43	0.02	0.29	0.01				
8	6.74	11.68	3.94	3.17	2.39	0.94	1.49	0.30	1.13	0.15	0.72	0.05	0.49	0.02	0.33	0.01				
9	7.58	14.53	4.43	3.94	2.69	1.17	1.67	0.37	1.27	0.19	0.81	0.06	0.55	0.02	0.37	0.01				
10	8.42	17.66	4.93	4.79	2.99	1.42	1.86	0.45	1.41	0.23	0.90	0.08	0.61	0.03	0.41	0.01				
12	10.11	24.75	5.91	6.71	3.58	1.98	2.23	0.63	1.69	0.32	1.08	0.11	0.73	0.04	0.49	0.02				
14	11.79	32.93	6.90	8.93	4.18	2.64	2.60	0.83	1.98	0.43	1.26	0.14	0.86	0.06	0.58	0.02				
16	13.48	42.16	7.88	11.44	4.78	3.38	2.97	1.07	2.26	0.55	1.44	0.18	0.98	0.07	0.66	0.03	0.40	0.01		
18	15.16	52.44	8.87	14.23	5.37	4.21	3.34	1.33	2.54	0.68	1.62	0.23	1.10	0.09	0.74	0.03	0.45	0.01		
20			9.85	17.29	5.97	5.11	3.72	1.61	2.82	0.83	1.80	0.28	1.22	0.11	0.82	0.04	0.50	0.01		
22			10.84	20.63	6.57	6.10	4.09	1.92	3.11	0.99	1.98	0.33	1.35	0.13	0.91	0.05	0.55	0.01		
24			11.82	24.24	7.17	7.17	4.46	2.26	3.39	1.16	2.16	0.39	1.47	0.15	0.99	0.06	0.60	0.02		
26			12.81	28.11	7.76	8.31	4.83	2.62	3.67	1.34	2.34	0.45	1.59	0.18	1.07	0.07	0.65	0.02		
28			13.80	32.25	8.36	9.53	5.20	3.01	3.95	1.54	2.52	0.52	1.71	0.20	1.15	0.08	0.70	0.02		
30			14.78	36.64	8.96	10.83	5.57	3.41	4.24	1.75	2.70	0.59	1.84	0.23	1.24	0.09	0.75	0.03		
32					9.55	12.21	5.94	3.85	4.52	1.97	2.88	0.66	1.96	0.26	1.32	0.10	0.80	0.03	0.37	0.00
34					10.15	13.66	6.32	4.31	4.80	2.21	3.06	0.74	2.08	0.29	1.40	0.11	0.85	0.03	0.39	0.00
36					10.75	15.18	6.69	4.79	5.08	2.45	3.24	0.82	2.20	0.32	1.48	0.12	0.90	0.04	0.41	0.01
38					11.35	16.78	7.06	5.29	5.36	2.71	3.42	0.91	2.33	0.36	1.57	0.14	0.95	0.04	0.44	0.01
40					11.94	18.45	7.43	5.82	5.65	2.98	3.60	1.00	2.45	0.39	1.65	0.15	1.00	0.04	0.46	0.01
42					12.54	20.20	7.80	6.37	5.93	3.27	3.78	1.09	2.57	0.43	1.73	0.16	1.05	0.05	0.48	0.01
44					13.14	22.02	8.17	6.94	6.21	3.56	3.96	1.19	2.69	0.47	1.81	0.18	1.10	0.05	0.51	0.01
46					13.73	23.91	8.55	7.54	6.49	3.86	4.14	1.29	2.82	0.51	1.90	0.19	1.15	0.06	0.53	0.01
48					14.33	25.87	8.92	8.15	6.78	4.18	4.32	1.40	2.94	0.55	1.98	0.21	1.20	0.06	0.55	0.01
50					14.93	27.90	9.29	8.79	7.06	4.51	4.50	1.51	3.06	0.59	2.06	0.23	1.25	0.07	0.58	0.01
55							10.22	10.49	7.76	5.38	4.95	1.80	3.37	0.71	2.27	0.27	1.37	0.08	0.63	0.01
60							11.15	12.33	8.47	6.32	5.40	2.11	3.67	0.83	2.47	0.32	1.50	0.09	0.69	0.01
65							12.07	14.30	9.18	7.33	5.85	2.45	3.98	0.96	2.68	0.37	1.62	0.11	0.75	0.02
70							13.00	16.40	9.88	8.41	6.30	2.81	4.29	1.10	2.89	0.42	1.74	0.12	0.81	0.02
75							13.93	18.63	10.59	9.56	6.75	3.20	4.59	1.25	3.09	0.48	1.87	0.14	0.86	0.02
80							14.86	21.00	11.29	10.77	7.20	3.60	4.90	1.41	3.30	0.54	1.99	0.16	0.92	0.02
85									12.00	12.05	7.65	4.03	5.21	1.58	3.50	0.60	2.12	0.18	0.98	0.03
90									12.71	13.40	8.10	4.48	5.51	1.76	3.71	0.67	2.24	0.20	1.04	0.03
95									13.41	14.81	8.55	4.95	5.82	1.94	3.92	0.74	2.37	0.22	1.09	0.03
100									14.12	16.28	9.00	5.45	6.12	2.13	4.12	0.81	2.49	0.24	1.15	0.04
110											9.90	6.50	6.74	2.55	4.53	0.97	2.74	0.29	1.27	0.04
120											10.80	7.63	7.35	2.99	4.95	1.14	2.99	0.34	1.38	0.05
130											11.70	8.85	7.96	3.47	5.36	1.32	3.24	0.39	1.50	0.06
140											12.60	10.16	8.57	3.98	5.77	1.52	3.49	0.45	1.61	0.07
150											13.50	11.54	9.19	4.52	6.18	1.73	3.74	0.51	1.73	0.08
160											14.40	13.01	9.80	5.10	6.60	1.95	3.99	0.57	1.84	0.09
170													10.41	5.70	7.01	2.18	4.24	0.64	1.96	0.10
180													11.02	6.34	7.42	2.42	4.49	0.71	2.07	0.11
190													11.64	7.01	7.83	2.67	4.74	0.79	2.19	0.12
200													12.25	7.71	8.24	2.94	4.98	0.86	2.30	0.13
220													13.47	9.19	9.07	3.51	5.48	1.03	2.53	0.16
240													14.70	10.80	9.89	4.12	5.98	1.21	2.76	0.18
260															10.72	4.78	6.48	1.41	2.99	0.21
280															11.54	5.48	6.98	1.61	3.22	0.25
300															12.37	6.23	7.48	1.83	3.45	0.28
320															13.19	7.02	7.98	2.06	3.68	0.31
340															14.02	7.86	8.47	2.31	3.91	0.35
360															14.84	8.73	8.97	2.57	4.14	0.39
380																	9.47	2.84	4.37	0.43
400																	9.97	3.12	4.60	0.48
420																	10.47	3.42	4.83	0.52
440																	10.97	3.72	5.06	0.57
460																	11.46	4.04	5.29	0.62
480																	11.96	4.37	5.52	0.67
500																	12.46	4.72	5.75	0.72

Notes: Shaded areas represent velocities over 5 fps. Use with caution when water hammer is a concern.