Exclusion

Exclusion refers to sealing up a structure to prevent pests from entering. In Massey's Pest Prevention Program, products designed to prevent pest entry and eliminate harborage sites should be utilized prior to the use of any outdoor chemicals. Because most pests originate outdoors, it's more environmentally responsible to block these pests from entering structures thus eliminating the need to use residual materials or baits indoors. Exclusion is our primary emphasis on every Initial Pest Prevention treatment. The most common methods we use to seal out pests include caulk, expandable foam, screen, hardware cloth, and copper Stuf-Fit. Use of these materials will be discussed below in the exclusion protocols. When weather gets cooler from December through February, insect activity drastically decreases but rodent activity increases. We place a heavy emphasis on exclusion of rodents and all other pests during these months when more time can be spent ensuring structures are well sealed.

Treatment Protocols

Caulk: FOR GAPS NO WIDER THAN ¼ INCH: We generally use clear Alex Plus (siliconized acrylic latex paintable) caulk. The treatment protocol starts with dusting the void to be caulked:

- Dust the void to be caulked to ensure no pests are breeding inside the gap/void
- Clean the surface to be caulked of dirt and debris
- Prepare the tube per instructions on the tube:
  1) With a box cutter, slice straight down at 45 degrees to the line running the tube length with the tube end resting on a hard surface backing. The cut should be about ½ inch back from the tip estimating how thick you want the bead
  2) Poke a fine wire (usually attached and swings out from the caulking gun edge) into the tip to poke open the inner seal to the caulk
  3) Place the tube into a caulking gun and click the compression rod until caulk comes to the tip
  4) Apply caulk along the crack in a single motion, as you firmly and carefully click pressure into the tube, not allowing the tip to break contact with the surface of the gap until the gap is completely sealed with fresh caulk
  5) Carefully run your finger over the surface to smooth the caulk over the gap for an airtight seal
  6) Remove any excess caulk on hands and surfaces with a damp cloth but do not use a cloth to finish off the bead
- For gaps ¼ inch to 5/8 inch wide first use backer rod. This is a soft round plastic foamed string that comes in many sizes and can be cut to length, stuffed down into

the crack, leaving its edge at the very middle but no higher than the top edges of the gap. Then caulk can be similarly applied and smoothed over the top of the rod to prevent drizzle into the gap.







Backer Rod

Expandable Foam:

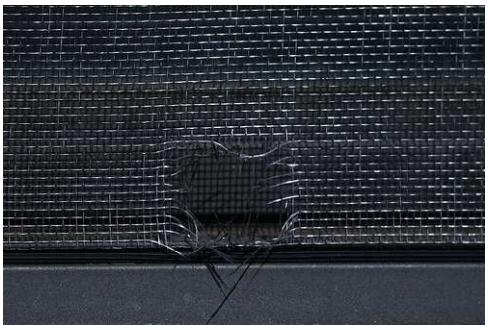
Canned "foam" that expands into gaps and then dries hard is a great material to fill larger gaps for crawling insects and rodents. If rodents are foamed out it is important to first place screen, Stuf-Fit, or similar material in and then foam over the blocked area, otherwise rodents often chew through the foam itself. The foam clings to hair and materials and dries rapidly. It will fuse to hair and skin and become very difficult to remove so it's important to be very careful where the foam tip is held and placed so as to not get any on yourself or your clothing. Wear goggles and gloves when applying foam. The foam can also drip from the tip and continue to come out after releasing the pressure tip. Place in just enough foam to begin to fill the gap…it will eventually expand to about 3 times the amount foamed in so be careful and frugal. About a day after the foam has dried, as in the photo below, then it can be trimmed back with a sharp knife flush with the surface.





Screen: Inspect pool enclosures, soffit and window screens for tears/holes

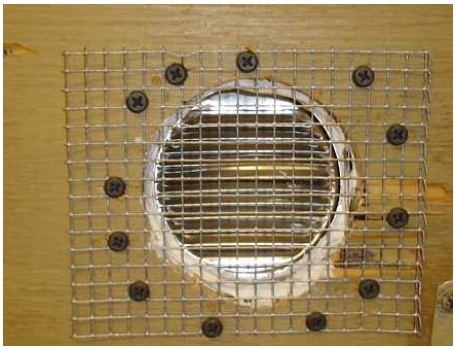
- Prior to patching a torn screen, get the customer's approval
- Make minor repairs by cutting a piece of screening just large enough to cover the damaged area
- Seal the edges with clear silicone sealant
- It is the customer's responsibility to repair any major tears/holes





Hardware cloth: ¼ inch galvanized hardware cloth is cut out with tin snips to cover over vents, over holes in wood siding, under eaves, etc. to block out rodents, snakes, frogs, etc.:

- Unroll the cloth to expose a section large enough to cut out the piece needed to cover well over the gap
- Carefully slice a piece of the cloth with tin snips so that the cloth will cover the gap
- Staple-gun or screw the cloth over the gap if it's wood
- Use liquid nail if the gap is a metal vent, metal siding, or cement gap



Copper Stuf-Fit: Stuf-Fit comes in a large roll of copper mesh material that can be cut or torn to fill holes and gaps larger than those that can be caulked but smaller than those that need foaming, typically about 1 inch by 3-4 inches. Firmly press bunched up pieces to fill into the gaps and press them in firmly with a screwdriver or hammer handle until it is flat across the gap.





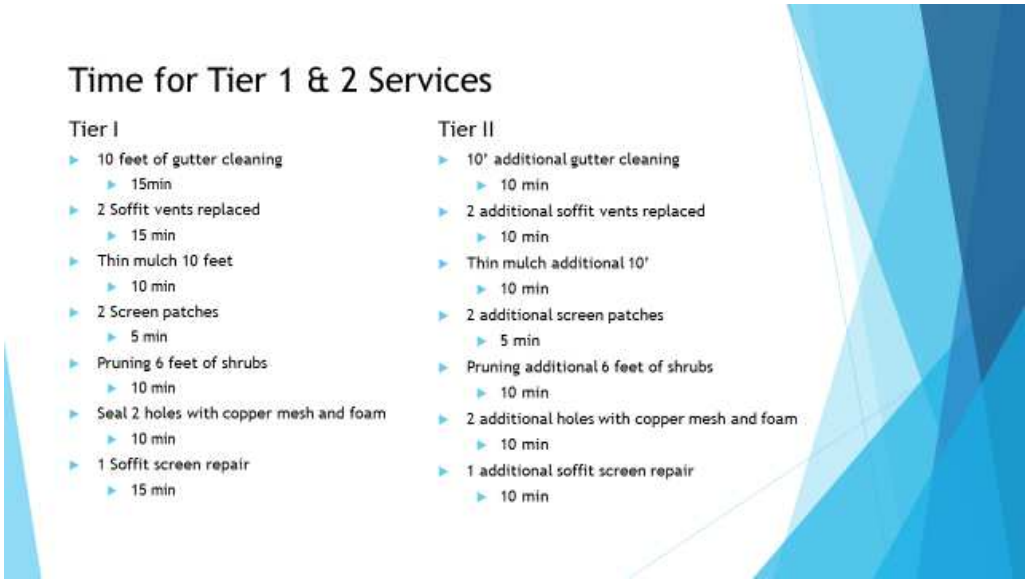


When possible, foam over the copper mesh and trim edges

NOTE: Structures should not be baited on the exterior with rodent stations until all exclusion is completed from the roof areas to the foundation of all gaps the size of a quarter or larger. Once the structure is sealed, approved rodent stations can be baited and placed around the exterior of the structure while pro-active indoor trapping continues until all rodent activity inside ceases.

Tiers of Exclusion:

Tier 1- Included with Initial & Regular services within allotted time frame
Tier 2- When the above exclusion work takes additional time
Tier 3- Exclusion that we do not normally provide but which specially trained Techs or Managers can provide
Tier 4- Exclusion Massey can generally provide using a subcontractor



WHAT IS TIER 3?

Items that are not normally performed as part of the Initial Service or Quarterly Service, requiring specialized training that enhances the performance of Pest Prevention.

- Rodent Exclusion – Metal screening, flashing, cementing, expandable foam
- Bird and Bat Exclusion - Bird Barrier, screening, bat netting, expandable foaming
- Insect Exclusion – Weep hole covers, foaming, Leaf Defier installation
- Moisture Management – Dryer vents, vapor barriers, foundation "Temp" vents

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Topic Category: Lawn

Recordable Verifiable Training Hours: 1

Objectives: This lesson is designed to teach how pre-emergent herbicides work.

Length of lesson: Approx 60 minutes.

Materials needed:

- Training Outline
- How Pre-Emergent Herbicides Work Training Document (below)
- 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 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 training materials on How Pre-Emergent Herbicides Work (below)
- 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 VTM's through Massey University.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Training Outline

1. Discuss the 5 Key Principles and how they can be used to control weeds.
    a. Name them in order of importance
    b. The best weed control is a thick, healthy lawn
    c. Use of herbicides falls into the 5th Key principle (which is the last resort of lawn care).
2. Review the training document on pre-emergent herbicides. Focus on key points which should include:
    a. Pre-emergent versus post-emergent herbicides (preventative vs. curative)
    b. Pre-emergent herbicides create a barrier in the soil where seeds germinate (they don't kill all the seeds and don't kill plants that have already germinated when they are applied).
    c. Even coverage is essential for proper control
    d. Soil residual
    e. Color of product and staining
    f. Why we tell customers to water it in if no rain
    g. Interject any personal experiences you may have with the use of pre-emergent herbicides
    h. Why we should not apply Pre-Emergence herbicides to turf with a compromised root system.
    i. The importance of not over applying pre-emergence herbicides
        i. Do not repeat applications more frequently than scheduled by our Agronomic Program
        ii. Do not perform any type of service call (requests/proactive) by way of a droptank with pre-emergence herbicide in the tank, because this would be an application in addition to our scheduled Agronomic Program.
        iii. Do not treat any area of turf at a rate higher than the scheduled application rate.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

The best weed control is a healthy, vigorous lawn. Many times, weeds in the landscape exist and thrive because the turfgrass is not maintained according to the 5 Key Principles of plant management (can you list them?). By utilizing the 5 Key Principles, weed problems will be less. However, weeds can sometimes exist in the landscape even when sound management is followed. In these cases, the use of herbicides is often needed. Herbicides can be used as a preventative approach (pre-emergence) or curatively (post emergence). There are advantages and disadvantages to each approach. The following will discuss the basics of weed management with pre-emergent herbicides.

One of the most effective ways to control weeds is to apply pre-emergence herbicides. By their very name, you can tell when these products are most effective; before the weeds emerge from the soil. Pre (before) emergence (the weeds break the surface of the soil). Pre-emergence herbicides will not control weeds that are actively growing above the soil surface. However, contrary to popular belief, they don't prevent weed seed germination either. These herbicides form a layer or barrier in the germination zone of the weed seeds (Figure 1). (Areas that have been missed with the treatment will not achieve weed control. An even application is of the utmost importance.) The germination zone simply means the area in the soil where weed seeds are most likely to sprout, which is usually the top 1-2 inches. Each herbicide family has a different way of affecting the weeds, but no herbicide kills the weed seeds directly. Some seeds are known to last hundreds of years, so if a pre-emergent herbicide isn't applied each year, weeds will infest the area.

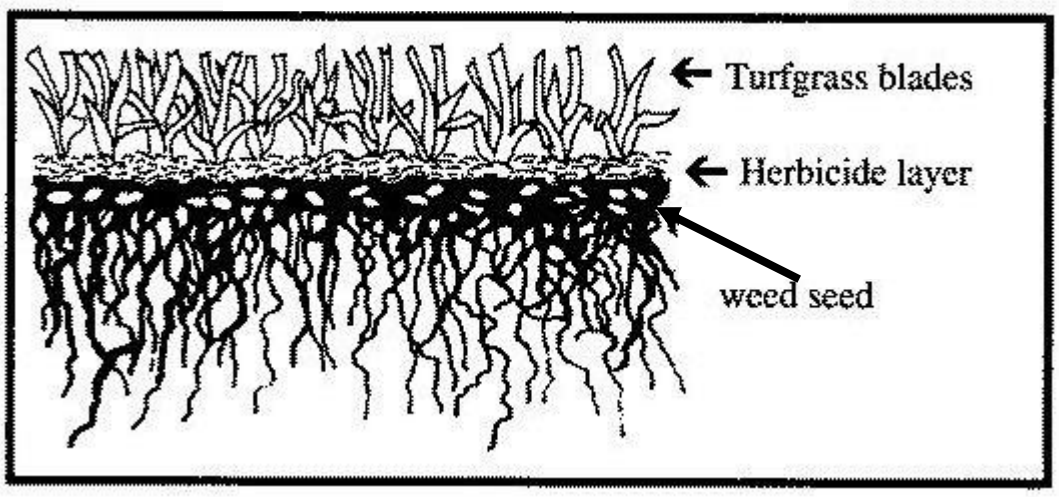


Figure 1. Pre-emergent herbicides create a barrier in the soil and prevent weeds from coming up through the turf canopy.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Understanding how the various pre-emergence herbicides work is necessary if optimum weed control is to be obtained and how to avoid turf injury. One of the most commonly used families of pre-emergence herbicides is the dinitroanilines (sometimes referred to as DNAs). Individual herbicides in this family include Prodiamine (various trade names including Barricade and Resolute), Pendimethalin (various trade names including Pendulum Aquacap and Pre-M), Surflan, and Balan. These DNA herbicides are widely used for pre-emergence weed control in established turfgrasses. Generally, they provide good weed control when applied correctly. By understanding how this family of herbicides provides weed control, it becomes clear why we apply them when we do.

First of all, DNAs do not prevent weed seed germination. As the seed germinates (the seed coat breaks and plant begins to grow), the herbicide is absorbed by young roots and emerging shoots. Cell division, a necessary process for making new plant tissue, is inhibited causing plant death in susceptible species. Therefore, for optimum control, it is necessary to apply these herbicides prior to expected weed germination. After application, these herbicides need rainfall or irrigation to move them into the soil profile. This produces an herbicide barrier on the soil surface. As weed seeds begin to germinate, they encounter this herbicide barrier, absorb the herbicide and fail to break the surface of the soil. Because this family of herbicides is not very water soluble and readily binds to soil particles, they tend to remain near the soil surface (within the top 2-3 inches) and do not leach through the soil profile. Therefore, this chemical barrier remains intact until soil microorganisms and other factors degrade the herbicide over time.

Atrazine and Simazine (Princep) can also be used for pre-emergence and belong to a family of herbicides called triazines. This is a very old class of chemistry and works by inhibiting photosynthesis. The triazines shut down the photosynthetic (food producing) process in susceptible plants by binding to specific sites within the plant's chloroplasts (energy factory). Inhibition of photosynthesis results in a slow starvation of the plant. Injury symptoms include yellowing (chlorosis) of leaf tissue followed by death (necrosis) of the tissue. Atrazine and Simazine are taken into the plant through the roots and leaves.

Rainfall or irrigation is needed to move Atrazine and Simazine into the soil profile. However, Atrazine is very soluble in water; whereas Simazine is not and behaves in soil as a DNA, too much water may move Atrazine too deeply in the soil and past the area where the weed seeds germinate. Additionally, excessive rainfall or irrigation can cause movement into ground or surface water.

Proper application of a pre-emergence herbicide timing means applying these products well in advance of expected germination.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Irrigation or rainfall soon after the application of a pre-emergent herbicide is crucial to good performance. The herbicide barrier formed in the soil becomes more complete and the herbicide evenly distributes across the soil profile after a little water is put on the site. Another reason watering in pre-emergence herbicides is important is that the herbicide moves into the germinating seedling through the uptake of water. If there is insufficient water, the seedlings can't take up enough herbicide to kill it.

Proper application also means thorough coverage. Weeds will sprout in areas that have not received proper coverage. Picture a lawn that has been streaked with fertilizer by improper coverage. A lawn that has received improper coverage of pre-emergence herbicide will also be "streaked" with weeds (weeds will emerge in the untreated or weakly treated strips).

It is also important that these herbicides be applied properly and at the correct rate to prevent turfgrass injury. Remember, these herbicides are absorbed by roots and inhibit root growth. If over applied to any given area of turf i.e. improperly calibrated applicators, excessive overlap, repeated applications, etc. they can cause significant harm to the turfgrass. When pre-emergence herbicides are tank mixed with insecticides or added to a dry fertilizer material, it is important to remember the pre-emergence is present in the application and to not apply additional mixed material trying to control an insect problem or improve the color of the lawn. When pre-emergence herbicides are used as a broadcast liquid application in our droptank, service calls of any kind must not be performed from the droptank containing pre-emergence herbicides, because the service call application would be done in addition to a regular scheduled application of pre-emergence herbicide.

Additionally, use pre-emergent herbicides only on established lawns with a healthy root system. Do not apply pre-emergence herbicides if the root system has been compromised by Pythium root rot, excessive nematode populations or any other factor. Pre-emergent herbicides can inhibit the establishment of sod and newly installed plugs. The label of all pre-emergent herbicides will give you the planting restrictions (how long you must wait before installing sod or plugs), but a good rule of thumb is not to apply a pre-emergent herbicide until the turf has been mowed at least 3 to 4 times. Most importantly, if the sod has not fully rooted into the existing soil, do not apply a pre-emergent.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Name _____ Date _____

PRE & POST TEST

1. T or F The best weed control a thick and healthy lawn.
2. T or F Key Principle #2 is applying pre-emergence properly.
3. T or F Pre-emergence herbicides kill weeds and their seeds.
4. T or F Pre-emergent herbicides kill weeds is by killing weed seeds in the soil before they germinate.
5. T or F Pendimethalin (Pre-M/ Pendulum Aquacap) and Prodiamine (Resolute) belong to the dinitroaniline family of herbicides.
6. T or F Pendimethalin and Prodiamine inhibit photosynthesis, which causes plant death.
7. T or F Atrazine and Simazine inhibit cell division, which causes plant death.
8. T or F Proper pre-emergent application should be made after weed germination.
9. T or F Using a droptank containing pre-emergence herbicide to perform a service call will result in an over application and turf injury.
10. T or F Water must be applied after an application of pre-emergent herbicide.
11. T or F Pre-emergence herbicide can be applied to newly installed sod or plugs 3 weeks after installation

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

PRE & POST TEST ANSWER KEY

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WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Topic Category: Lawn

Recordable Verifiable Training Hours: 1

Objectives: This lesson is designed to teach how pre-emergent herbicides work.

Length of lesson: Approx 60 minutes.

Materials needed:

- Training Outline
- How Pre-Emergent Herbicides Work Training Document (below)
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Training Guidelines:

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WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

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    d. Soil residual
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    f. Why we tell customers to water it in if no rain
    g. Interject any personal experiences you may have with the use of pre-emergent herbicides
    h. Why we should not apply Pre-Emergence herbicides to turf with a compromised root system.
    i. The importance of not over applying pre-emergence herbicides
        i. Do not repeat applications more frequently than scheduled by our Agronomic Program
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WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

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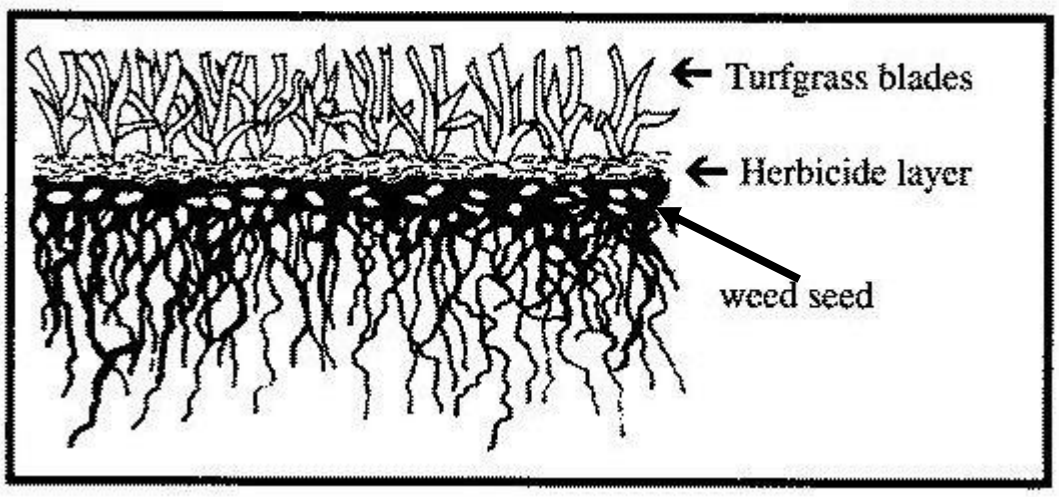


Figure 1. Pre-emergent herbicides create a barrier in the soil and prevent weeds from coming up through the turf canopy.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

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Proper application of a pre-emergence herbicide timing means applying these products well in advance of expected germination.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

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Proper application also means thorough coverage. Weeds will sprout in areas that have not received proper coverage. Picture a lawn that has been streaked with fertilizer by improper coverage. A lawn that has received improper coverage of pre-emergence herbicide will also be "streaked" with weeds (weeds will emerge in the untreated or weakly treated strips).

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Additionally, use pre-emergent herbicides only on established lawns with a healthy root system. Do not apply pre-emergence herbicides if the root system has been compromised by Pythium root rot, excessive nematode populations or any other factor. Pre-emergent herbicides can inhibit the establishment of sod and newly installed plugs. The label of all pre-emergent herbicides will give you the planting restrictions (how long you must wait before installing sod or plugs), but a good rule of thumb is not to apply a pre-emergent herbicide until the turf has been mowed at least 3 to 4 times. Most importantly, if the sod has not fully rooted into the existing soil, do not apply a pre-emergent.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Name _____ Date _____

PRE & POST TEST

1. T or F The best weed control a thick and healthy lawn.
2. T or F Key Principle #2 is applying pre-emergence properly.
3. T or F Pre-emergence herbicides kill weeds and their seeds.
4. T or F Pre-emergent herbicides kill weeds is by killing weed seeds in the soil before they germinate.
5. T or F Pendimethalin (Pre-M/ Pendulum Aquacap) and Prodiamine (Resolute) belong to the dinitroaniline family of herbicides.
6. T or F Pendimethalin and Prodiamine inhibit photosynthesis, which causes plant death.
7. T or F Atrazine and Simazine inhibit cell division, which causes plant death.
8. T or F Proper pre-emergent application should be made after weed germination.
9. T or F Using a droptank containing pre-emergence herbicide to perform a service call will result in an over application and turf injury.
10. T or F Water must be applied after an application of pre-emergent herbicide.
11. T or F Pre-emergence herbicide can be applied to newly installed sod or plugs 3 weeks after installation

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

PRE & POST TEST ANSWER KEY

1. T or F The best weed control a thick and healthy lawn.
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WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Topic Category: Lawn

Recordable Verifiable Training Hours: 1

Objectives: This lesson is designed to teach how pre-emergent herbicides work.

Length of lesson: Approx 60 minutes.

Materials needed:

- Training Outline
- How Pre-Emergent Herbicides Work Training Document (below)
- 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 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 training materials on How Pre-Emergent Herbicides Work (below)
- 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 VTM's through Massey University.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Training Outline

1. Discuss the 5 Key Principles and how they can be used to control weeds.
    a. Name them in order of importance
    b. The best weed control is a thick, healthy lawn
    c. Use of herbicides falls into the 5th Key principle (which is the last resort of lawn care).
2. Review the training document on pre-emergent herbicides. Focus on key points which should include:
    a. Pre-emergent versus post-emergent herbicides (preventative vs. curative)
    b. Pre-emergent herbicides create a barrier in the soil where seeds germinate (they don't kill all the seeds and don't kill plants that have already germinated when they are applied).
    c. Even coverage is essential for proper control
    d. Soil residual
    e. Color of product and staining
    f. Why we tell customers to water it in if no rain
    g. Interject any personal experiences you may have with the use of pre-emergent herbicides
    h. Why we should not apply Pre-Emergence herbicides to turf with a compromised root system.
    i. The importance of not over applying pre-emergence herbicides
        i. Do not repeat applications more frequently than scheduled by our Agronomic Program
        ii. Do not perform any type of service call (requests/proactive) by way of a droptank with pre-emergence herbicide in the tank, because this would be an application in addition to our scheduled Agronomic Program.
        iii. Do not treat any area of turf at a rate higher than the scheduled application rate.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

The best weed control is a healthy, vigorous lawn. Many times, weeds in the landscape exist and thrive because the turfgrass is not maintained according to the 5 Key Principles of plant management (can you list them?). By utilizing the 5 Key Principles, weed problems will be less. However, weeds can sometimes exist in the landscape even when sound management is followed. In these cases, the use of herbicides is often needed. Herbicides can be used as a preventative approach (pre-emergence) or curatively (post emergence). There are advantages and disadvantages to each approach. The following will discuss the basics of weed management with pre-emergent herbicides.

One of the most effective ways to control weeds is to apply pre-emergence herbicides. By their very name, you can tell when these products are most effective; before the weeds emerge from the soil. Pre (before) emergence (the weeds break the surface of the soil). Pre-emergence herbicides will not control weeds that are actively growing above the soil surface. However, contrary to popular belief, they don't prevent weed seed germination either. These herbicides form a layer or barrier in the germination zone of the weed seeds (Figure 1). (Areas that have been missed with the treatment will not achieve weed control. An even application is of the utmost importance.) The germination zone simply means the area in the soil where weed seeds are most likely to sprout, which is usually the top 1-2 inches. Each herbicide family has a different way of affecting the weeds, but no herbicide kills the weed seeds directly. Some seeds are known to last hundreds of years, so if a pre-emergent herbicide isn't applied each year, weeds will infest the area.

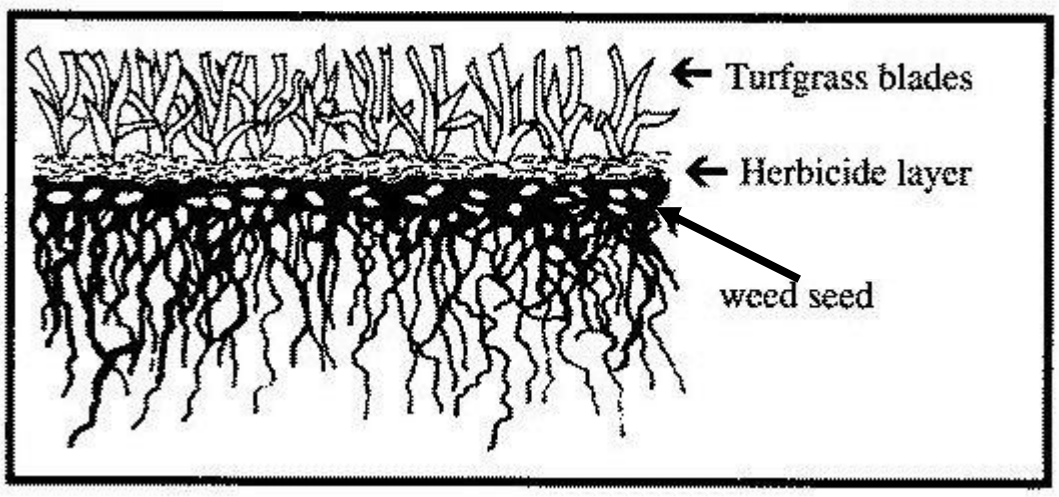


Figure 1. Pre-emergent herbicides create a barrier in the soil and prevent weeds from coming up through the turf canopy.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Understanding how the various pre-emergence herbicides work is necessary if optimum weed control is to be obtained and how to avoid turf injury. One of the most commonly used families of pre-emergence herbicides is the dinitroanilines (sometimes referred to as DNAs). Individual herbicides in this family include Prodiamine (various trade names including Barricade and Resolute), Pendimethalin (various trade names including Pendulum Aquacap and Pre-M), Surflan, and Balan. These DNA herbicides are widely used for pre-emergence weed control in established turfgrasses. Generally, they provide good weed control when applied correctly. By understanding how this family of herbicides provides weed control, it becomes clear why we apply them when we do.

First of all, DNAs do not prevent weed seed germination. As the seed germinates (the seed coat breaks and plant begins to grow), the herbicide is absorbed by young roots and emerging shoots. Cell division, a necessary process for making new plant tissue, is inhibited causing plant death in susceptible species. Therefore, for optimum control, it is necessary to apply these herbicides prior to expected weed germination. After application, these herbicides need rainfall or irrigation to move them into the soil profile. This produces an herbicide barrier on the soil surface. As weed seeds begin to germinate, they encounter this herbicide barrier, absorb the herbicide and fail to break the surface of the soil. Because this family of herbicides is not very water soluble and readily binds to soil particles, they tend to remain near the soil surface (within the top 2-3 inches) and do not leach through the soil profile. Therefore, this chemical barrier remains intact until soil microorganisms and other factors degrade the herbicide over time.

Atrazine and Simazine (Princep) can also be used for pre-emergence and belong to a family of herbicides called triazines. This is a very old class of chemistry and works by inhibiting photosynthesis. The triazines shut down the photosynthetic (food producing) process in susceptible plants by binding to specific sites within the plant's chloroplasts (energy factory). Inhibition of photosynthesis results in a slow starvation of the plant. Injury symptoms include yellowing (chlorosis) of leaf tissue followed by death (necrosis) of the tissue. Atrazine and Simazine are taken into the plant through the roots and leaves.

Rainfall or irrigation is needed to move Atrazine and Simazine into the soil profile. However, Atrazine is very soluble in water; whereas Simazine is not and behaves in soil as a DNA, too much water may move Atrazine too deeply in the soil and past the area where the weed seeds germinate. Additionally, excessive rainfall or irrigation can cause movement into ground or surface water.

Proper application of a pre-emergence herbicide timing means applying these products well in advance of expected germination.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Irrigation or rainfall soon after the application of a pre-emergent herbicide is crucial to good performance. The herbicide barrier formed in the soil becomes more complete and the herbicide evenly distributes across the soil profile after a little water is put on the site. Another reason watering in pre-emergence herbicides is important is that the herbicide moves into the germinating seedling through the uptake of water. If there is insufficient water, the seedlings can't take up enough herbicide to kill it.

Proper application also means thorough coverage. Weeds will sprout in areas that have not received proper coverage. Picture a lawn that has been streaked with fertilizer by improper coverage. A lawn that has received improper coverage of pre-emergence herbicide will also be "streaked" with weeds (weeds will emerge in the untreated or weakly treated strips).

It is also important that these herbicides be applied properly and at the correct rate to prevent turfgrass injury. Remember, these herbicides are absorbed by roots and inhibit root growth. If over applied to any given area of turf i.e. improperly calibrated applicators, excessive overlap, repeated applications, etc. they can cause significant harm to the turfgrass. When pre-emergence herbicides are tank mixed with insecticides or added to a dry fertilizer material, it is important to remember the pre-emergence is present in the application and to not apply additional mixed material trying to control an insect problem or improve the color of the lawn. When pre-emergence herbicides are used as a broadcast liquid application in our droptank, service calls of any kind must not be performed from the droptank containing pre-emergence herbicides, because the service call application would be done in addition to a regular scheduled application of pre-emergence herbicide.

Additionally, use pre-emergent herbicides only on established lawns with a healthy root system. Do not apply pre-emergence herbicides if the root system has been compromised by Pythium root rot, excessive nematode populations or any other factor. Pre-emergent herbicides can inhibit the establishment of sod and newly installed plugs. The label of all pre-emergent herbicides will give you the planting restrictions (how long you must wait before installing sod or plugs), but a good rule of thumb is not to apply a pre-emergent herbicide until the turf has been mowed at least 3 to 4 times. Most importantly, if the sod has not fully rooted into the existing soil, do not apply a pre-emergent.

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

Name _____ Date _____

PRE & POST TEST

1. T or F The best weed control a thick and healthy lawn.
2. T or F Key Principle #2 is applying pre-emergence properly.
3. T or F Pre-emergence herbicides kill weeds and their seeds.
4. T or F Pre-emergent herbicides kill weeds is by killing weed seeds in the soil before they germinate.
5. T or F Pendimethalin (Pre-M/ Pendulum Aquacap) and Prodiamine (Resolute) belong to the dinitroaniline family of herbicides.
6. T or F Pendimethalin and Prodiamine inhibit photosynthesis, which causes plant death.
7. T or F Atrazine and Simazine inhibit cell division, which causes plant death.
8. T or F Proper pre-emergent application should be made after weed germination.
9. T or F Using a droptank containing pre-emergence herbicide to perform a service call will result in an over application and turf injury.
10. T or F Water must be applied after an application of pre-emergent herbicide.
11. T or F Pre-emergence herbicide can be applied to newly installed sod or plugs 3 weeks after installation

WEEKLY TRAINING SESSION

How Pre-Emergence Herbicides Work

PRE & POST TEST ANSWER KEY

1. T or F The best weed control a thick and healthy lawn.
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WEEKLY TRAINING SESSION

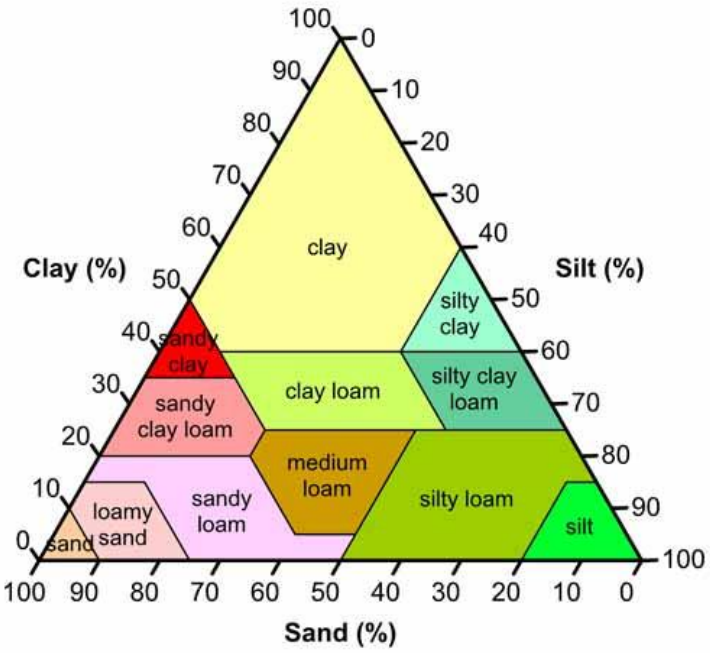
Plant Soil and Water Relationships

Plant Soil

-A plant's root system depends on water and the health of the soil it is planted in to survive.
-The health of the soil depends on the type of soil, texture, and micronutrients available for plant use.
-Water helps the plant absorb the micronutrients from the soil.
-Reclaimed water and well water are generally high in phosphorus content, making the soil somewhat acidic. This phosphorus can help to balance the PH for the plant material.

Water holding capacity

-Different plant soils have different soil textures. These soil textures dictate what the water holding capacity will be for that type of soil.
Example:



-The soil type with the highest water holding capacity is clay and silty clay. The texture of this soil is very fine allowing little room for water to saturate or be evaporated through evapotranspiration. Also known as ET.

-In the central and south Florida we have sand and loamy sand. These are the types of soil that have the least amount of holding capacity. The texture of sand and loamy sand is larger course granular particles which gives the water a path to saturate and experience more loss through ET.

Holding capacity

Each soil type is capable of holding a certain amount of water.

-Clay will hold approximately 1.6"- 2.5" per foot.
-Sand is at 0.4" – 0.75" per foot
-loamy sand is 0.75 – 1.25" per foot

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WEEKLY TRAINING SESSION

Plant Soil and Water Relationships

Soil water holding capacity is the amount of water that a given soil can hold for crop (plant) use. **Field capacity** is the point where the **soil water holding capacity** has reached its maximum. Here in Florida our goal for irrigation systems is to replenish the soil up to 75% of **field holding capacity.**

A plant's water requirements are determined by how much water is lost through the combination of *evaporation* and *transpiration*, also known as *evapotranspiration* (ET).

Evaporation
Evaporation is when excess water is turned into gas by the atmospheric conditions surrounding the water. Visually it seems to disappear, but is actually evaporating. Evaporation amounts can change between full sun areas and partial shaded areas on the same property.

Transpiration
Transpiration is the loss of water in the form of water vapor, mainly from the stomata in leaves, but also through evaporation from the surfaces of leaves, flowers, and stems. Transpiration amounts can change between full sun areas and partial shaded areas on the same property.

Evapotranspiration (ET)
Loss of water from the soil both by evaporation from the soil surface and by transpiration from the leaves of the plants growing in it. ET helps us determine how much water is being removed from the soil conditions.
-During the months of November, December and January, the ET rate here in Florida can range from .6" to .9" per week.
-During the dry months of April, May, and June, Florida's ET rate can be as high as 2.1" per week
-The remainder of the year the ET rate in Florida will range between .9" to 1.5" per week.

Water holding capacity, ET, and irrigation precipitation rate
Understanding water holding capacity and evapotranspiration (ET), will help you understand how important the precipitation rate on an irrigation system is. The precipitation rate determines how much water the irrigation system is putting back into the soil for plant use:

-The ET rate for one week is 1.5".
-We have PGP rotors covering the area with a precipitation rate of .75" per hour.
-We run that zone twice a week for 1 hour each cycle.
-We have replaced the 1.5" of ET loss for the week.

Water in soil can be replaced by rain and irrigation. Irrigation is a supplement to rainfall.

WEEKLY TRAINING SESSION

Steps of Irrigation Service Part 2

21 Steps of Irrigation Service Part 2:

STEP 13 Identify Valve Wire and Splice Issues

FREQUENCY – 2x per Year

- Missing waterproof splice connectors
- Broken wires at solenoid
  - Irritrol solenoid with white wires





STEP 14 Observe All Zones in Operation

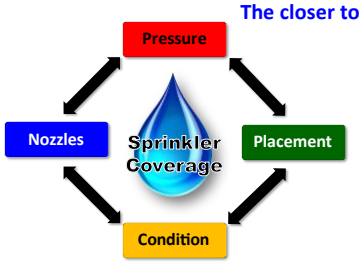
FREQUENCY – Every Service

- This is a general aspect of the inspection meant to convey the comprehensive nature of our service
  - This will be accomplished by completing tasks #15 through #20

STEP 15 Verify Adequate Sprinkler Coverage

FREQUENCY – Every Service

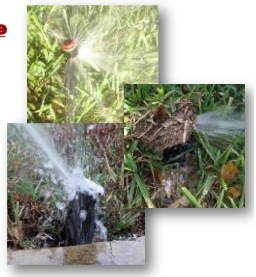
The closer to the manufacturer's optimums, the better the coverage



STEP 16 Identify Sprinkler Condition Issues

FREQUENCY – Every Service

- Arc Out of Adjustment*
- Sprinkler Aimed Improperly*
- Clogged Spray / Rotator Nozzles or Screens*
- Turf Overgrown Sprinkler*
- Crooked Sprinkler
- Sunken Sprinkler
- Sprinkler Too High
- Plant Blocking Sprinkler



** Adjustment included in service*

STEP 17 Realign Sprinkler Nozzles (*as needed*)



FREQUENCY – Every Service

- Re-aiming the sprinkler
  - Twist tubes on spray bodies
  - Rotors MAY be able to be twisted slightly on swing joint
    - May have to pull internal for larger adjustments
- Adjusting the breakup screw
  - MPs and sprays have minimal adjustment
  - Rotors have a maximum of 25% reduction
- This adjustment is to be made at the time of the service

STEP 18 Adjust Sprinkler Arc (*as needed*)

FREQUENCY – Every Service

- Put the water back where it is needed
  - Arc adjustment may require water landing outside target area to compensate for prevailing winds
- Variable Arc Spray Nozzles (VANs)
  - Most are easily knocked out of arc with mowing equipment

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WEEKLY TRAINING SESSION

Steps of Irrigation Service Part 2

STEP 19 Clean Sprinkler Nozzles /Screens (*as needed*)

FREQUENCY – Every Service

- Look for irregular spray pattern
  - Spray nozzles are most susceptible to clogging compared to rotors
- Clogged screens reduce or stop the flow of the nozzle
- Examine the material caught in the nozzle to determine if filtration is needed



STEP 20 Identify Leaks in Pipe /Tubing (*above ground*)



FREQUENCY – Every Service

- Looking for the obvious after zones have been operating
  - Soggy area in turf
  - Water running down pavement
  - Geysers

STEP 21 Verify Component Inventory

FREQUENCY – 2x per Year

- Identify that there are not any changes made to the system that we did not do
  - A sprinkler capped instead of repaired/replaced
  - New drip
  - New controller
  - Missing rain sensor