

Lawn Care Best Management Practices

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Turfgrass

Learning Objectives

At the end of this unit, you will be able to articulate and explain:

- Terms associated with turfgrass identification;
- Turf species grown in Maryland;
- Lawn establishment practices – seeding, sod, and site preparation;
- Cultural practices – fertilizing, mowing, watering, thatch control, aeration, and liming;
- Common lawn problems including, weeds, insect pests, diseases, and abiotic disorders.

Introduction

Lawns are an integral part of Maryland landscapes. In addition to enhancing the landscape, lawns provide practical benefits. A healthy lawn increases property values, controls soil erosion, filters pollution from runoff, moderates summer ground temperatures, and adds oxygen to the air. On the other hand, misapplication of pesticides and fertilizers greatly contributes to pollution of the Chesapeake Bay. Proper timing, selection, and correct application rates of these products can greatly reduce the negative impact the improper use of these products have on the health of the Bay. Proper cultural practices that encourage a healthy lawn are also essential.

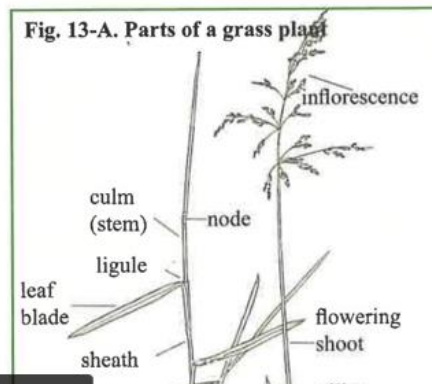
Turfgrass Identification

Turfgrass terminology

Vegetative parts of a grass plant (Fig. 13-A) are useful for identifying a grass. Also consider:

- Leaf blade;
- Leaf sheath;
- Vernation;
- Collar;
- Ligule;
- Auricles; and
- Growth habit.

Figures 13-B to 13-H illustrate each of these and give hints on what to look for when



Turfgrass Maintenance Practices

- Variety Selection
- Mowing
- Watering
- Fertilizing
- Aerating/Thatching
- Pest Management



Site Evaluation



- Shade/Sun
- Slope/Aspect
- Wet/dry
- Soil texture and nutrients
- Species present
- Use/traffic
- Functionality within the landscape

Turfgrass Quality Components

- Density
- Drought tolerance
- Persistence
- Pest Tolerance
- Color
- Uniformity
- Wear Tolerance

Turfgrass Identification

Fig. 13-A. Parts of a grass plant

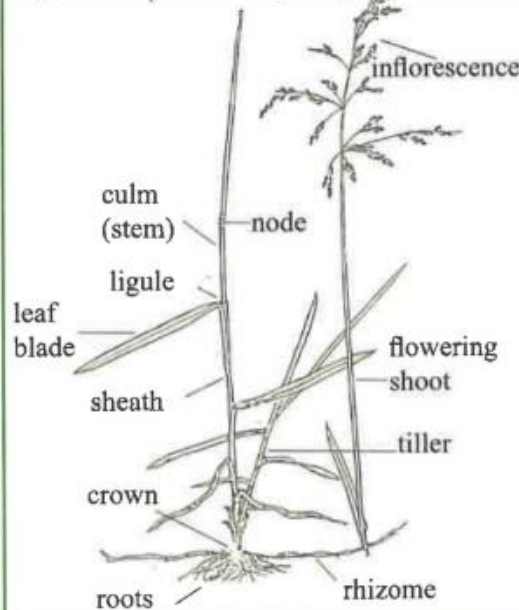
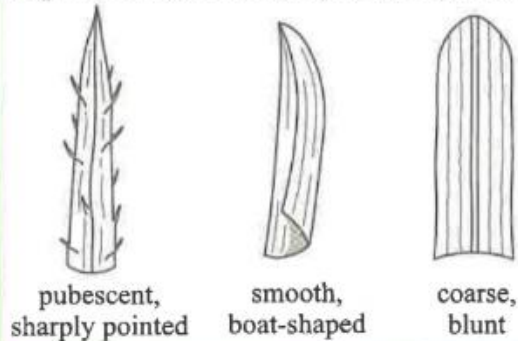


Fig. 13-B. Leaf blade shapes and textures



Turfgrass Identification

Fig. 13-C. Leaf sheath types

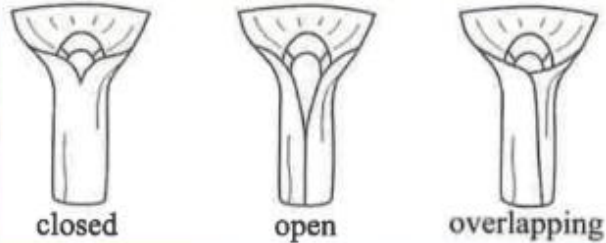


Fig. 13-D. Vernation types

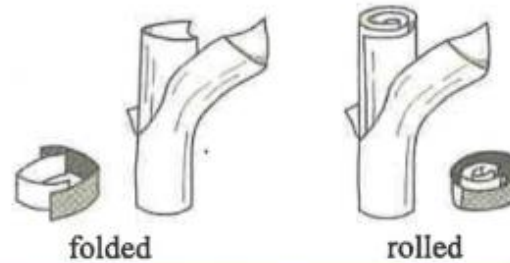
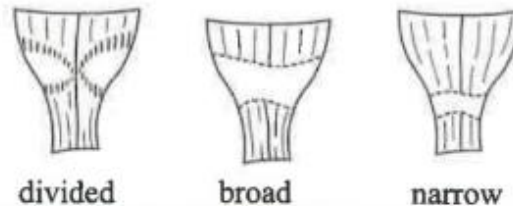


Fig. 13-E. Collar types



Turfgrass Identification

Fig. 13-F. Ligule types



absent



smooth,
membranous



hairy

Fig. 13-G. Auricle types



absent

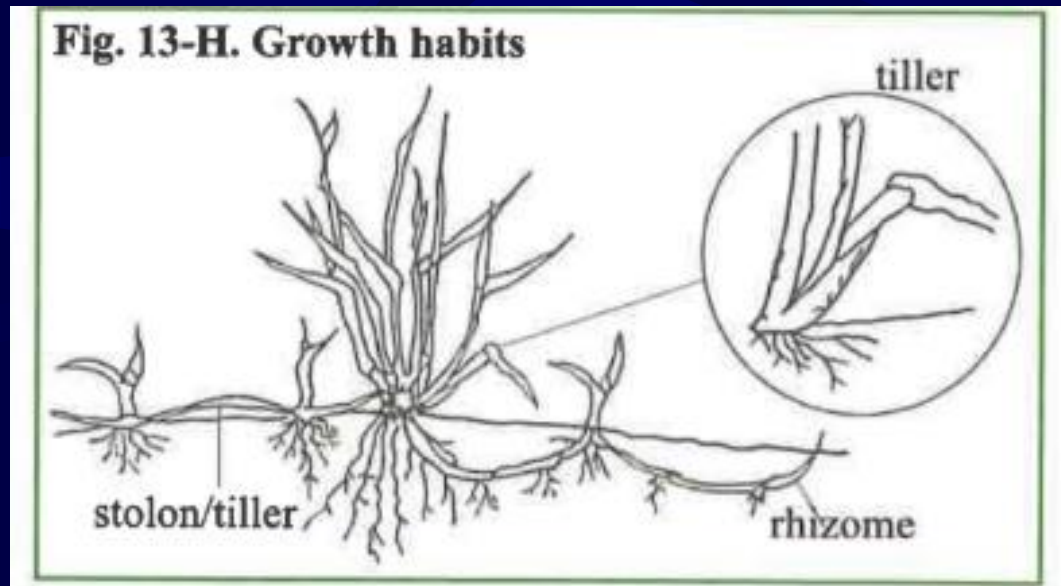


small



prominent

Turfgrass Growth Habit



Common Lawn Grasses of the Mid-Atlantic

- Tall Fescue
- Fine Fescue
- Zoysiagrass



Turfgrass Transition Zone



Courtesy of Sodsolutions.com

Mid-Atlantic Common Turfgrasses

- Tall fescue-
 - “Turf-type tall fescue”
 - Sunny areas, not shady areas
 - A “bunch-type” grass
 - Overseed thin areas for density



Mid-Atlantic Common Turfgrasses

- Fine fescue-
 - Fine leaf blade
 - More shade tolerant
 - Available in “Shady Mix”



Mid Atlantic Common Turfgrasses

- - Zoysiagrass
 - Warm-season grass
 - Established by plugs or sprigs
 - Spreads
 - Stolons- above ground
 - Rhizomes -below ground



Other MD turgrasses

- Bermudagrass- Typically used in athletic field or home lawns on Eastern Shore
- Kentucky bluegrass- Typically used on high-end athletic fields or in mixtures with tall fescue
- Perennial ryegrass- Typically used on golf courses

Table 13-A. Characteristics of turfgrass species

Species	Drought tolerance	Full sun	Shade	High traffic tolerance	Insect and disease resistance	Days to seed germination
Turf-type tall fescue	Excellent	Excellent	Fair	Good	Good	7-14
Kentucky bluegrass	Good	Excellent	Fair - poor	Excellent	Poor	14-21
Fine fescue	Good - fair	Good - fair	Excellent - good	Poor	Good	7-14
Perennial ryegrass	Poor	Excellent	Fair - poor	Good	Poor (fair if seeds contain endophytes*)	5-10
Zoysia-grass	Excellent	Excellent	Poor	Good	Good	N/A
Bermuda-grass	Excellent	Excellent	Poor	Excellent	Good	N/A

**Endophytes are beneficial fungi or bacteria that live within plant tissue. Perennial ryegrass and fescue turf with high endophyte levels are more drought resistant and less prone to damage from sod webworm and chinch bugs.*

How do you pick the best variety?

- University of Maryland Turfgrass Variety Recommendations
- Sod- Must be a good performing cultivar in MD/VA

RECOMMENDED TURFGRASS CULTIVARS FOR CERTIFIED SOD PRODUCTION AND SEED MIXTURES IN MARYLAND



University of Maryland
Turfgrass Technical Update
TT-77 June 2019

Dr. Thomas Turner, Turfgrass Specialist and David Funk, Manager of Paint Branch Turfgrass Research Center
University of Maryland - Department of Plant Science & Landscape Architecture

Numerous new turfgrass cultivars continue to be developed and released by turfgrass breeders. However, while many of these cultivars are adapted to the environmental conditions that prevail in other regions of the country, many are not adapted to the difficult environmental conditions that occur in the transition zone, which includes Maryland and Virginia. Thus, to identify cultivars that will perform well in this region, extensive cultivar trials are evaluated each year at the University of Maryland and Virginia Polytechnic Institute and State University.



The cultivar performance data obtained at various locations in Maryland and Virginia are reviewed annually in a joint meeting of university researchers and representatives of the Departments of Agriculture of both states. The use of recommended cultivars usually results in a turfgrass stand of higher quality and density, greater stress tolerance, lower nutrient requirements, less water usage, and fewer pest problems. Also, the use of recommended cultivars generally has the benefits of a reduction in the need for pesticide applications, greater water infiltration, reduced water runoff, and the enhancement of the environmental benefits of properly managed turfgrass.

There has been extensive interest in recent years regarding turfgrass species that have reduced nutrient requirements, especially nitrogen. The two recommended turfgrass species with the lowest nitrogen requirements are the fine fescues and zoysiagrass, while turf-type tall fescue and bermudagrass have intermediate requirements. Although Kentucky bluegrass generally has the highest nitrogen requirements, research is currently ongoing to identify Kentucky bluegrass cultivars that provide good quality under reduced nitrogen fertility and other maintenance inputs.

The following lists of recommended cultivars consist of two groups. "Proven" cultivars represent those that have been performing well in trials in both states over multiple years, and have had certified seed tested by the MD and/or VA Departments of Agriculture. "Promising" cultivars, listed in *green italics*, have shown good performance, but may have been tested in Maryland or Virginia for only 2 years, or may be difficult to find due to limited seed availability.

Turf-Type Tall Fescue Sod

The following proven and promising turf-type tall fescue cultivars may be seeded individually or in blends, and may be mixed with Kentucky bluegrass (see note below for percentages). Addition of Kentucky bluegrass in the recommended percentages may improve sod strength as well as improving overall performance and quality without increasing management inputs.

Proven Turf-type Tall Fescue Cultivars

Annapolis ⁴	Hemi	Saltillo
Avenger II	Hot Rod ⁴	Screamer LS ⁴
Blacktail ⁴	Hounddog 8	Speedway ⁴
Bladerunner II ⁴	Inferno ⁴	Spyder LS
Bloodhound	Integrity ¹	SR 8650 ⁴
Bullseye	Justice	Sunset Gold ¹
Catalyst ⁴	Leonardo	Super Sonic ⁴
Crossfire 4 ⁴	Maestro	Technique ⁴
Embrace ⁴	Meridian ⁴	Temple ⁴
Falcon V ⁴	Michelangelo	Terrano ⁴
Fantasia ⁴	Mustang 4	Thor ⁴
Fayette	Penn RK4	Titanium 2LS
Firebird 2 ⁴	Raptor III	Trinity ⁴
Firecracker SLS ⁴	Rebel IV	Turbo
4 th Millennium SRP ⁴	Rebel V	Turbo RZ
Foxhound ⁴	Rebound	Turfway
Gazelle II	Reflection	Valkyrie LS ⁴
Gold Medallion	Regenerate	Witchita ⁴
Grande 3	Rendition Rx ¹	Xtender ⁴
GTO ⁴	Rockwell	Xtremegreen ⁴
Guardian 41 ⁴	Rowdy	

Promising Turf-type Tall Fescue Cultivars

<i>AST 7003</i>	<i>Monument</i>	<i>Raindance</i>
<i>AST 9003</i>	<i>Moondance</i>	<i>Six Point</i>
<i>Birmingham</i>	<i>Moondance GLX</i>	<i>South Fork</i>
<i>Firewall</i>	<i>Paramount</i>	<i>Springwood</i>
<i>Lifeguard</i>	<i>Pro Gold</i>	<i>WATKINS</i>

'Vitality' and 'Top Choice' blends

Turf-Type Tall Fescue Sod

The following recommended and promising turf-type tall fescue cultivars may be seeded individually or in blends, and may be mixed with Kentucky bluegrass (see note below for percentages). Addition of Kentucky bluegrass may improve sod harvestability as well as improving overall performance and quality without increasing management inputs.

Proven turf-type tall fescue cultivars:

AST 9003 ³	Guardian 21 ⁴	2nd Millennium ⁴
Avenger ²	Hemi	Shenandoah Elite
Barvado ⁴	Hounddog 5 ⁴	Shenandoah III
Bingo ⁴	Inferno ⁴	Sidewinder
Blackwatch ⁴	Integrity	Skyline
Bullseye	Justice	Spyder LS ←
Cochise III ^{3,4}	Magellan	Sunset Gold ←
Constitution ⁴	Masterpiece ⁴	Tahoe II ←
Coyote II ^{3,4}	Matador GT ⁴	Taos ^{3,4}
Dakota	Monet	Tarheel II ⁴
Darlington	Montana ⁴	3 rd Millennium SRP
Davinci ⁴	Mustang 4	Titanium ⁴
Daytona ^{3,4}	Pedigree	Titanium LS
Endeavor ^{3,4}	Penn 1901 ⁴	Tombstone ^{3,4}
Faith ³	Penn RK	Traverse
Falcon IV	Raptor II ←	Tulsa Time
Falcon V	Rebel Exeda ⁴	Turbo
Fidelity ⁴	Rebel IV	Van Gogh
Firecracker LS	Regiment II ^{3,4}	Wolfpack ^{3,4}
Forte ^{3,4}	Rendition ⁴	Wolfpack II ³
Grande II ⁴	Rendition Rx	Xtremegreen
Greenkeeper WAF ⁴	Rhambler SRP	

Promising turf-type tall fescue cultivars:

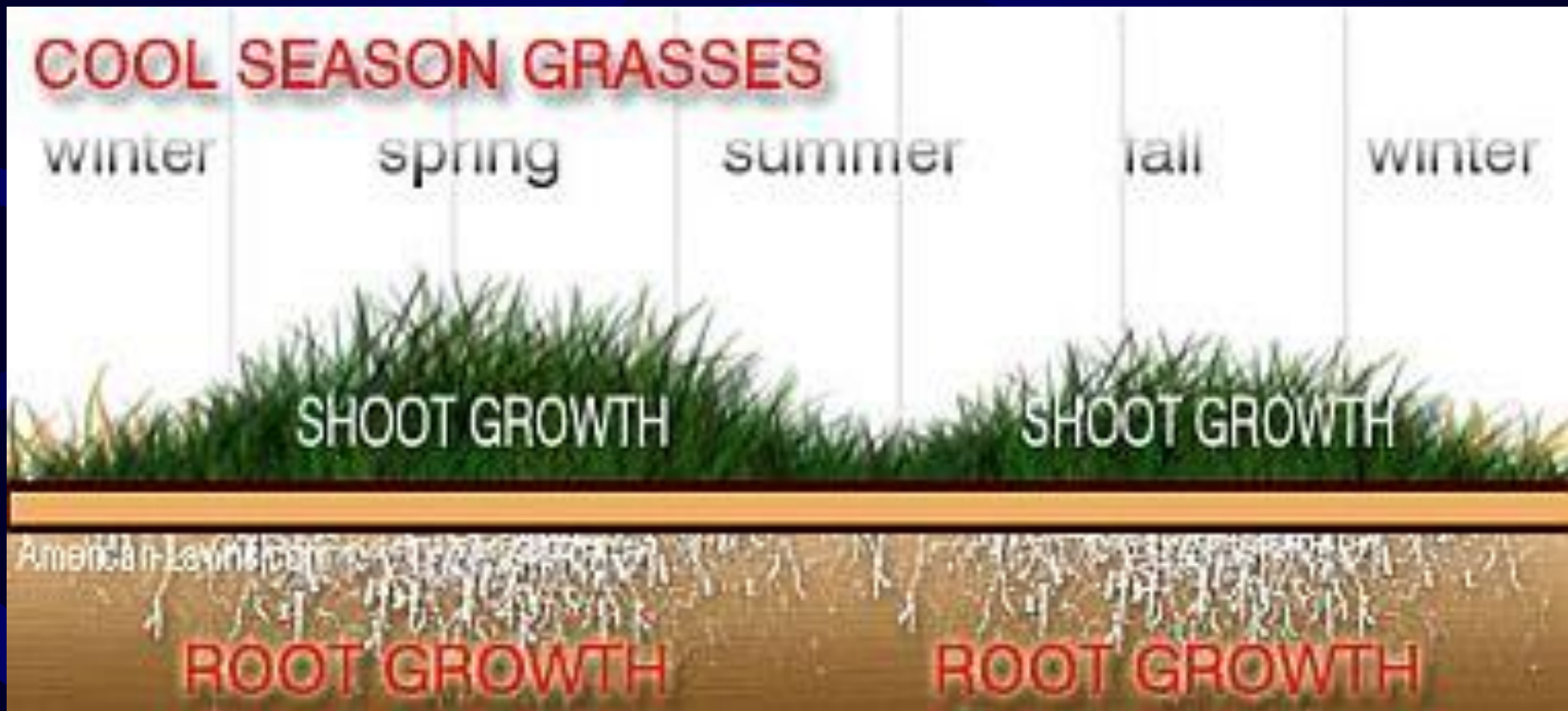
<i>AST 7002</i>	<i>Essential</i> ←	<i>LS 1010</i>
<i>Bladerunner II</i>	<i>Fat Cat</i>	<i>LS1200</i>
<i>Braveheart</i>	<i>Firenza</i>	<i>Rocket</i>
<i>Cannavaro</i>	<i>Garrison</i> ←	<i>Speedway</i>
<i>Catalyst</i>	<i>Gazelle II</i> ←	<i>SR 8650</i>
<i>Cezanne RZ</i>	<i>Gold Medallion</i>	<i>Talladega</i>
<i>Cochise IV</i>	<i>Greenbrooks</i>	<i>Umbrella</i>
<i>Corona</i>		

Where to buy quality seed?*

- Site One Landscape Supply
- Newsom Seed- Fulton
- Chesapeake Valley Seed
 - Bowen's Farm Supply, Annapolis
 - Riverhill Garden Center, Clarksville
 - Turf Center, Inc., Spencerville

*-Mention of companies does not imply endorsement of said organization

Cool-Season Grass Growth



Warm-Season Grass Growth



Mowing

- Crown- Turfgrass growing point is at the bottom of the plant.
- Height – Different grasses, different heights
- Cool-season- Higher height in summer
- Warm-season- Higher height in spring/fall

Mowing Height

- Tall fescue – 3”- 3 ½ ”
- Zoysiagrass- 1 ½” -3”
- Fine fescue- 3”- 3 ½ ”

- Why mow high?
 - Greater traffic tolerance

 - Deeper root growth

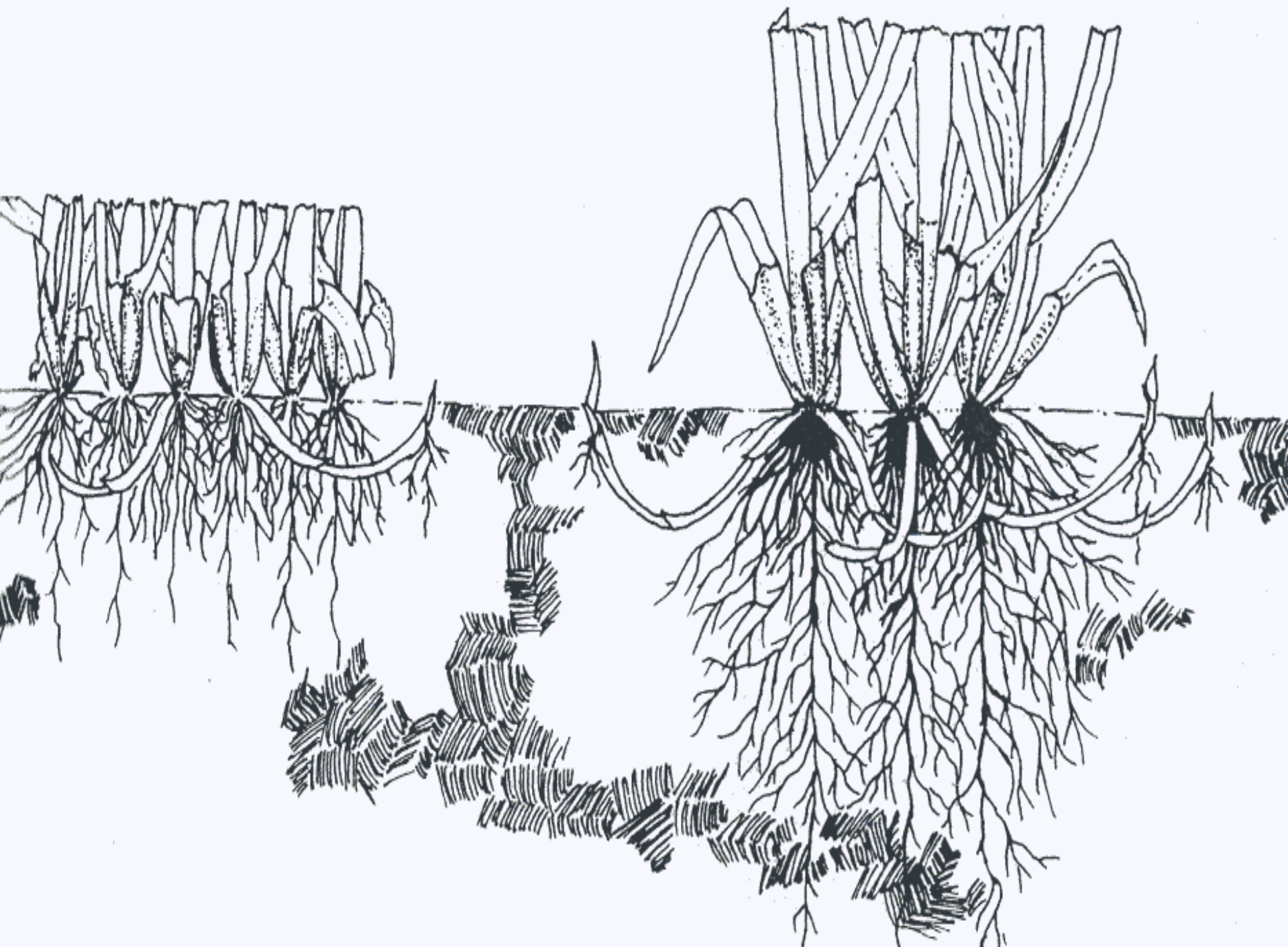
 - Water conservation



Rotary blade mower



Reel blade mower



Mulch mowing– “Grasscycling”

- Mulch mow clippings
 - Consider a mulching mower
 - Use a “mulching blade” OR insert return plug in grass chute



Courtesy of www.turf.msu.edu/dealing-with-leaves

Mulch mowing- Why discard free fertilizer?

- Free fertilizer for your lawn
 - ~30% of seasonal needs
- Returning clippings – environmentally responsible
- Clippings DO NOT contribute to thatch development



Mowing Tips

- Don't remove more than one-third of leaf blade
 - If grass is too high, mow high, then lower next time
- Sharp blades = Clean cut = Less disease potential and better appearance
 - Sharpen blades in winter, consider sharpening again in mid-summer



Protecting Water Quality

- Sweep clippings and fertilizer back into lawn, not the street
- Wash mower on lawn, not the driveway or sidewalk
- Minimize chemical and fertilizer storage and be sure container is sealed/secure
- Always follow label directions

Lawn Watering

- 1” water / week in June, July, August
 - Measure with rain gauges or shallow cans
- Water deeply without creating puddles or runoff
- Water indicators: -Footprinting - Gray-blue color



Watering

- If needed, water in morning
- Use a water timer

Automatic irrigation systems

- Assess water schedule regularly
- Inspect the system monthly
- Install a rain shutoff device



Aerifying/De-Thatching

- Cool-season: Fall or Spring
- Warm-season: May-August



Aerating

- Aerating (Coring)
 - Aerating- Relieves compaction to allow for infiltration of water, fertilizer
 - Reduces water runoff
 - Increases oxygen levels
 - Should be done during ‘primary windows of opportunity’



De-thatching

- De-thatching
 - Physically removes thatch
 - Reduces water runoff
 - Increases oxygen levels
 - Should be done during ‘primary windows of opportunity’

Thatch layer



Lawn Fertilization

Maryland Fertilizer Law



How To
Fertilize Your Lawn Responsibly
It's All in the Bag

Maryland's Lawn Fertilizer Law In a Nutshell

Maryland's lawn fertilizer law helps protect the Chesapeake Bay from excess nutrients entering its waters from lawns and other managed grassy areas. If you fertilize your lawn yourself, here's what you need to know and do to prevent excess nutrients from washing off your property and into storm drains, streams, and rivers that feed the Bay.

- Do not over-fertilize. Follow University of Maryland fertilizer recommendations at extension.umd.edu/hgic.
- A single fertilizer application may not exceed 0.9 pound total nitrogen per 1,000 square feet which can include no more than 0.7 pound of soluble nitrogen per 1,000 square feet. For seasonal and yearly fertilizer rates, visit extension.umd.edu/hgic. Search for **HG 112**.
- Most Maryland lawns have sufficient phosphorus. Do not apply phosphorus to lawns unless a soil test shows that your soil is in the low to medium range or you are establishing or renovating your lawn.
- Keep fertilizer applications 10 to 15 feet from waterways.
- Fertilizer applications are prohibited between November 15 and March 1.
- Do not fertilize when the ground is frozen or if heavy rain is predicted.
- Do not use fertilizers to de-ice walkways and driveways.
- If fertilizer lands on an impervious surface, sweep it back onto the grass or clean it up.

8.00 x 15.50 in

From Maryland Department of Agriculture
“How to Fertilize Your Lawn Responsibly”

Factors Affecting Lawn Fertilization

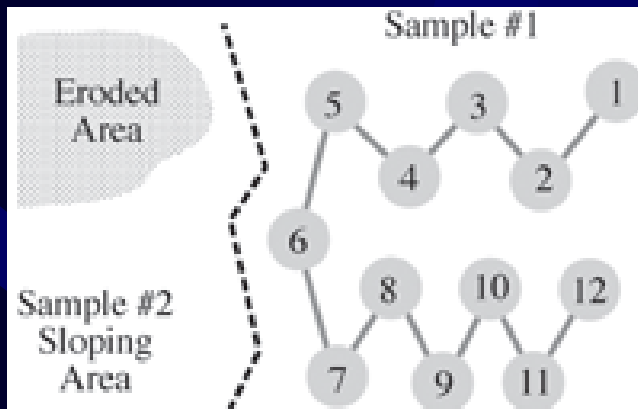
- Soil Type
- Type and Age of Turfgrass
- Length of Growing Season
- Traffic
- Shade

Factors Affecting Lawn Fertilization

- Quality Desired
- Clipping Management
- Micronutrients
- Fertilization Application Equipment

Soil testing

- Best to soil test every 3 years for nutrient needs
 - Shows levels of major and minor nutrients, pH, organic matter content
 - Test will provide nutrient and lime recommendations

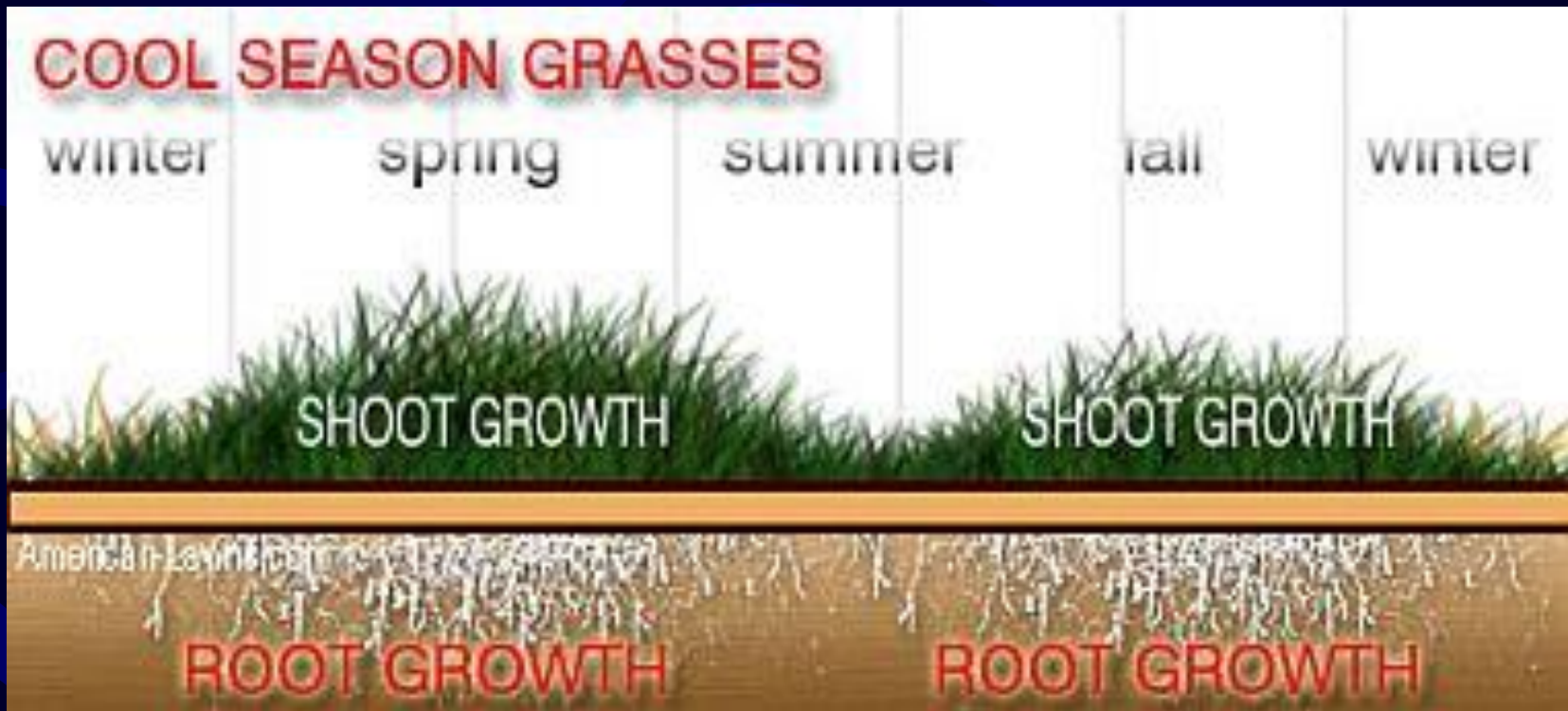


Courtesy of Virginia Tech (www.ext.vt.edu/pubs/compost/452-129/takingsample.html)



Courtesy of Virginia Tech (www.ext.vt.edu/pubs/compost/452-129/takingsample.html)

Cool-Season Grass Growth



Warm-Season Grass Growth



What do the numbers on the bag
mean?

N-P-K

Nitrogen for top growth
("Up")

Phosphorus for root growth
("Down")

Potassium for overall stress tolerance
("All around")

Secondary Elements

- Sulfur (S)
- Calcium (Ca)
- Magnesium (Mg)

Micronutrients

- Needed in small amounts, but still “needed”
- Usually adequate in medium-heavy soils and acidic pH
- Sandy soil- more prone to deficiencies
- Soil test will indicate levels and recommendations, if needed

Micronutrients

- Iron (Fe)
- Manganese (Mn)
- Sodium (Na)
- Nickel (Ni)
- Cobalt (Co)
- Boron (B)
- Zinc (Zn)
- Chlorine (Cl)
- Copper (Cu)
- Molybdenum (Mo)
- Silicon (Si)
- Aluminum (Al)

Lawn Fertilization

- Choose products with at least 50 % of N available as “slow release” or “water insoluble” for longer, sustained feeding and safety to turfgrass
- Avoid high P fertilizers if soil test indicates P is adequate
- “Water in” fertilizer to move it off the leaf blade into the soil
- Avoid fertilizing before a heavy rain
- Sweep fertilizer off hard surfaces!!!



Lawn Fertilization-How Much?

Tall Fescue

0.9 lb. N/ 1000 ft²

May/Early June

September

October

Apply 0.9 lb. N/ 1000 ft²/ application

Emphasize fall fertilization

Fine Fescue

0.5 lb. N/ 1000 ft²

May/Early June

0.9 lb. N/ 1000 ft²

October

Lawn Fertilization-How Much?

Zoysiagrass

0.9 lbs. N/ 1000 ft²

June

July/August (optional)

Apply 0.9 lb. N/ 1000 ft²/ application
Emphasize summer fertilization

Lawn Fertilization- How Much?

Fertilize at the Right Time

To prevent runoff, fertilizer should only be applied to lawns when the grass is actively growing. Fertilize warm season grasses (Bermudagrass and Zoysiagrass) in late spring or summer and cool season grasses (fescues, bluegrass) in fall, based on soil test results. Do not exceed single and yearly application limits.

Nitrogen Fertilizer Guide by Turf Type							
Grass	September	October	Late May	Early June	July	August	Maximum Yearly
Tall fescue	0.9 lb	0.9 lb	0.5-0.9 lb <i>if needed</i>	—	—	—	2.7 lbs
Kentucky bluegrass	0.9 lb	0.9 lb	0.5-0.9 lb <i>if needed</i>	—	—	—	2.7 lbs
Fine fescue	—	0.9 lb	0.5 lb	—	—	—	1.4 lbs
Bermudagrass	—	—	—	0.9 lb	0.5-0.9 lb <i>if needed</i>	—	2.7 lbs
Zoysiagrass	—	—	—	0.9 lb	0.5-0.9 lb <i>if needed</i>	—	1.8 lbs

From Maryland Department of Agriculture
“How to Fertilize Your Lawn Responsibly”

Reading a fertilizer label



Guaranteed Analysis

Total Nitrogen	10%
1.9% Nitrate Nitrogen	
0.5% Other Water Soluble Nitrogen	
7.6% Water Insoluble Nitrogen	
Soluble Potash (K ₂ O)	6%

Derived from: hydrolyzed poultry feather meal, nitrate of soda, potassium sulfate, bone meal and soybean meal.

Spreader Calibration

- 1) Calculate how much product is needed for 1,000 ft²
 - 2) For even coverage, fertilize in two different directions at half rate.
-

Example: 0.9 lb. of N using 10-0-6 on a 2,000 ft² lawn

$0.9 / 10\% = 9 \text{ lb. product for } 0.9 \text{ lb. N on } 1,000 \text{ ft}^2$

$9 \text{ lb. product per } 1,000 \text{ ft}^2 \times 2 = 18 \text{ lb. product for } 2,000 \text{ ft}^2$



Be Careful !!!

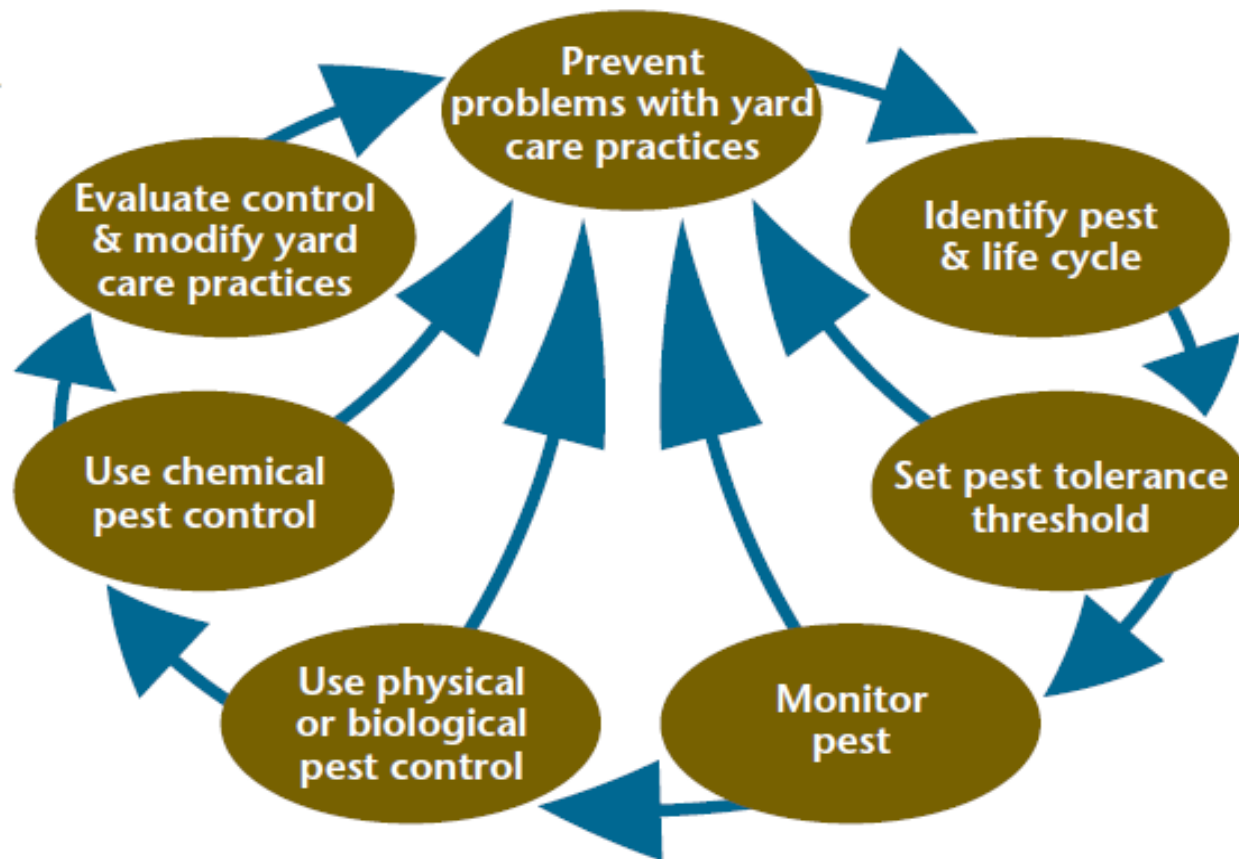


IPM

What is IPM?

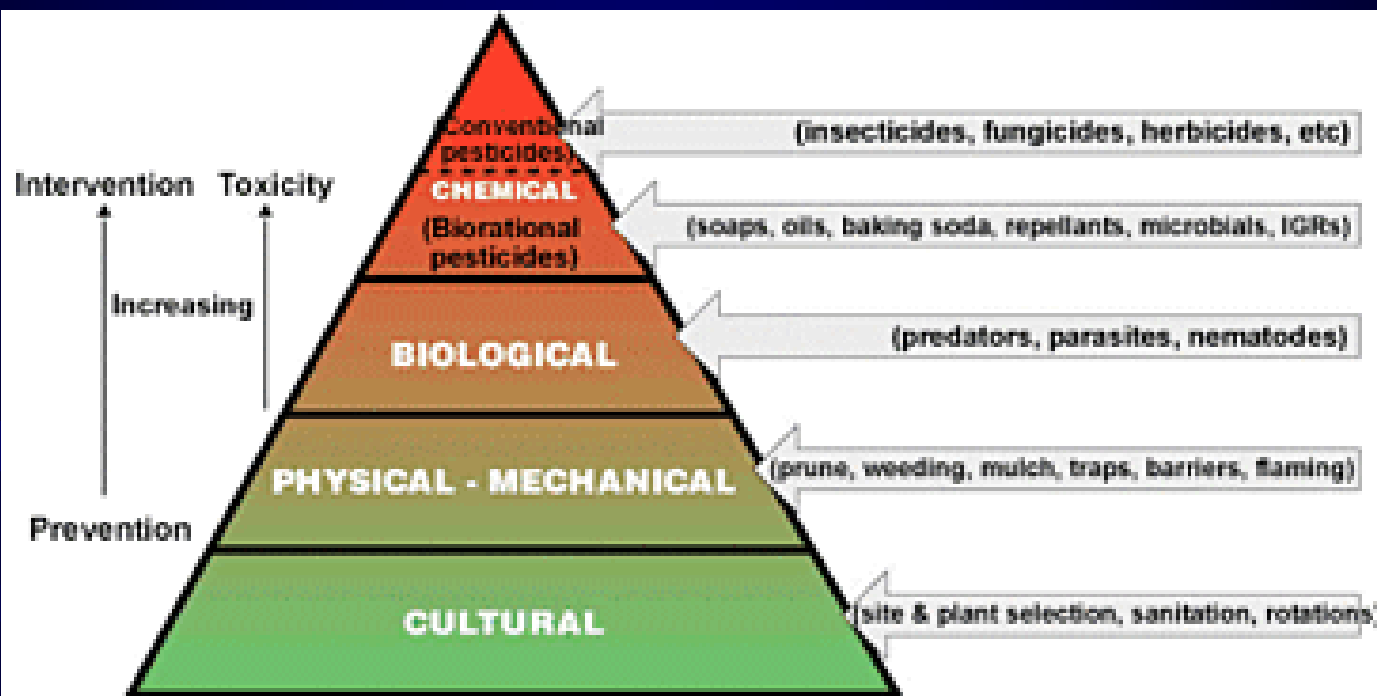
How do we use it in lawn care?

The IPM Process



Integrated Pest Management

- Host tolerance/resistance (“Right grass, right place”)
- Cultural controls (Fertilizing, Watering, Mowing, Aerating)
- Sanitation (Wash mower after each use)
- Biological controls (Example: Milky spore for grubs)
- Mechanical controls (Example: Handpicking weeds)
- Chemical controls (Select less toxic and biocontrols first!)



Pyramid of IPM Tactics

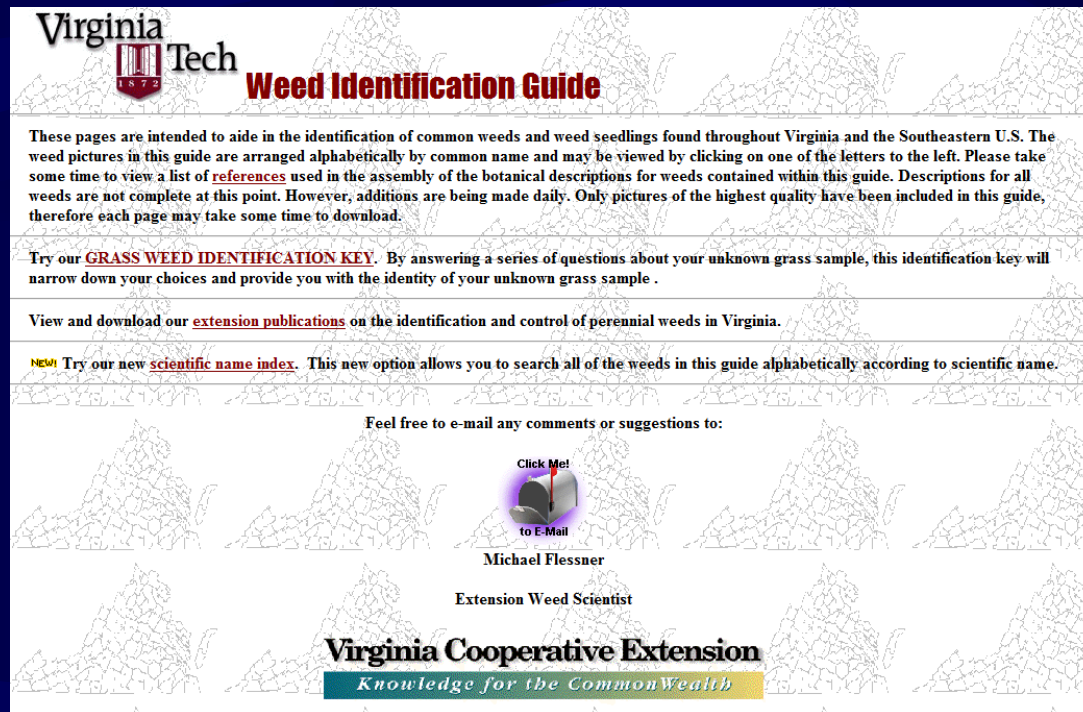
Plants

Applying Pesticides Safely

- Identify the pest
- Choose the correct product
- Read the label
- Wear protective clothing

Weed Identification

- Virginia Tech Weed Identification Guide
- Michigan State - Msuturfweeds.net



Virginia Tech **Weed Identification Guide**


These pages are intended to aid in the identification of common weeds and weed seedlings found throughout Virginia and the Southeastern U.S. The weed pictures in this guide are arranged alphabetically by common name and may be viewed by clicking on one of the letters to the left. Please take some time to view a list of [references](#) used in the assembly of the botanical descriptions for weeds contained within this guide. Descriptions for all weeds are not complete at this point. However, additions are being made daily. Only pictures of the highest quality have been included in this guide, therefore each page may take some time to download.

Try our [GRASS WEED IDENTIFICATION KEY](#). By answering a series of questions about your unknown grass sample, this identification key will narrow down your choices and provide you with the identity of your unknown grass sample .

View and download our [extension publications](#) on the identification and control of perennial weeds in Virginia.

NEW! Try our new [scientific name index](#). This new option allows you to search all of the weeds in this guide alphabetically according to scientific name.

Feel free to e-mail any comments or suggestions to:



Michael Flessner
Extension Weed Scientist

Virginia Cooperative Extension
Knowledge for the Commonwealth

Weed Growth Habit

- Rosette – Dandelion, Carrot, Plantain
- Creeping – Clover, ground ivy
 - Stolons- Above-ground runners
 - Rhizomes- Below-ground runners

Weed Life Cycle/Biology

- Perennials – Live over multiple years
- Annuals- Complete life cycle in one year or less
- Biennials- Vegetative growth 1st year, flower during 2nd year

Weed Life Cycle/Biology

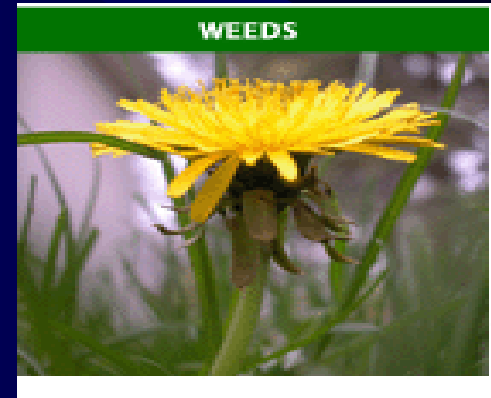
- Perennials (Examples: Dandelion, buckhorn plantain, white clover)
- Summer Annual grasses (Examples: Large and smooth crabgrass, goosegrass)
- Summer Annual broadleaves (Examples: Lambsquarter, spurge)
- Winter Annual grasses (Example: Annual bluegrass)
- Winter Annual broadleaves (Examples: Henbit, chickweed, purple deadnettle)

Weed Life Cycle/Biology

- Summer Annual grasses (Examples: Large and smooth crabgrass, goosegrass)
- Summer Annual broadleaves (Examples: Lambsquarter, spurge)
- Winter Annual grasses (Example: Annual bluegrass)
- Winter Annual broadleaves (Examples: Henbit, chickweed, purple deadnettle)

Weed control strategies

- Weeds are often symptoms of cultural problems
- Establish tolerance levels
- Think twice before using pesticides and **ALWAYS** read and follow label directions
- As last resort, spot spray- Don't "blanket spray"
- Avoid broadcast spraying or "weed 'n' feeding"
- Overseed with seed/soil mix to fill in open and thin areas



Weeds as Indicators

<http://www.purdue.edu/envirosoft/lawn/src/pest/indicators2.htm>

- **Acid soils**-bentgrass, red sorrel
- **Compacted soils**- annual bluegrass, common chickweed, prostrate knotweed, mouse-ear chickweed, prostrate spurge
- **Dry soils**-black medic, red sorrel
- **Dry and infertile soils**- yarrow
- **Low fertility soils**- plantains, red sorrel, smooth brome, bentgrass
- **Low mowing height**- annual bluegrass, bentgrass
- **Moist or poorly drained soils**- annual bluegrass, bentgrass, common chickweed, ground ivy, mouse-ear chickweed, speedwells, violets, yellow nutsedge
- **Moist infertile soil**- white clover
- **Moist shade**- annual bluegrass, rough bluegrass, violets
- **Shade**- annual bluegrass, common chickweed, moss, ground ivy, mouse-ear chickweed, violets

Weeds as Indicators

University of Illinois Extension

<http://web.extension.illinois.edu/cfiv/homeowners/980411.html>

- **Acid soils** (bentgrass, red sorrel)
- **Compacted soils** (annual bluegrass, bermuda grass, common chickweed, goosegrass, knotweed, mouse-ear chickweed, prostrate spurge)
- **Dry soils** (black medic, carpetweed, red sorrel, sandbur)
- **Dry and infertile soils** (yarrow)
- **High fertility soil** (annual bluegrass, bentgrass, bermudagrass, crabgrass, mallow, purslane)
- **Low fertility soils** (plantains, red sorrel, smooth brome, timothy)
- **Low mowing height** (annual bluegrass, bentgrass, bermudagrass, crabgrass, white clover)
- **Moist or poorly drained soils** (annual bluegrass, bentgrass, common chickweed, crabgrass, goosegrass, ground ivy, mouse-ear chickweed, speedwells, violets, yellow nutsedge)
- **Moist fertile soils** (curly dock, henbit, yellow wood sorrel)
- **Moist infertile soil** (white clover)
- **Moist shade** (annual bluegrass, nimblewill, rough bluegrass, violets)
- **New seedings** (barnyard grass, crabgrass, henbit, purslane, yellow foxtail)
- **Shade** (annual bluegrass, common chickweed, ground ivy, mouse-ear chickweed, nimblewill, violets)

Weed Identification



Mechanical Weed Control

- Can be a viable option with small populations of non-creeping weeds
- Hand/Weed Tool Weeding
- Raking or de-thatching- weak rooted annuals.

Mechanical Weed Control

- Weed Hound
- Screwdriver
- Flame



Types of Herbicides

- Pre-emergence
- Post-emergence
- Non-Selective
- Selective
 - Broadleaf
 - Grass



Courtesy: Engage Agro

Organic Weed Control

Table 5.4 - Some organic weed control products marketed for use in lawns.

Active ingredient	Product(s)	Uses
Acetic acid (vinegar)	Weed/Grass Killer, Natural Weed Control, Erath Earth, Maestro-Gro Blackjack 21, Burnout Weed & Grass Killer	Nonselective, seedling weed control.
Ammoniated soap of fatty acid	Garden Safe Weed & Grass	Nonselective, seedling weed control.
Cinnamon Bark	AgraLawn Crabgrass Killer, Garden Weasel	Crabgrass control in warm-season lawns.
Cinnamon oil, rosemary oil	Organic Weed Killer	Nonselective, seedling weed control.
Citric acid	Burnout 2, Natural Weed Control	Nonselective, seedling weed control.

HOME GROUNDS & ANIMALS 2020

Lawn: Weeds 5-13

Table 5.4 - Some organic weed control products marketed for use in lawns. (cont.)

Active ingredient	Product(s)	Uses
Citrus oil (d-limonene)	Nature's Avenger, Worry Free Weed & Grass Killer	Nonselective, seedling weed control.
Clove oil	EcoSmart, Bioganic Weed & Grass Killer, Burnout 2	Nonselective, seedling weed control.
Corn gluten (Alaninyl-alanine)	Amaizeingly Green, Corn Weed Blocker, Espoma Green, Weed Man, WOW!, NaturO, Jonathan Green Organic Weed Control, Safe-T-Weed, Gard'n-Wise Organics, Dynaweed, Concern Weed Prevention Plus	Preemergence weed control in turfgrass. 9% slow-release nitrogen source by weight.
Ethanoic acid	Burnout Weed & Grass Killer	Nonselective, seedling weed control.
Thyme oil	Bioganic Weed & Grass Killer	Nonselective, seedling weed control.
Iron HEDTA	Weed Beater FE, Iron X, Fiesta Turf Weed Killer	Selective postemergence control or suppression of broadleaf weeds in turf

From Virginia Cooperative Extension Publication "Pest Management Guide: Home Grounds and Animals, 2020"

Less-Toxic Weed Control Products

Less-toxic alternative products

- BurnOut (II)- Acetic acid and clove oil
 - Bayer Natria Lawn Weed Killer- Iron chelate (HEDTA)
 - Ortho Eco Sense Lawn Weed Killer- Iron chelate (HEDTA)
- Organic/biorational products often require more than 1 app



Pre-Emergent- Summer annual grasses

- Targets crabgrass and goosegrass
- Crabgrass germination- 55° F soil temp for several days
- Apply during full forsythia or daffodil bloom
- Second application in 8-10 weeks
- Goosegrass germinates 2 weeks after crabgrass



Pre-emergent herbicides

Common Preemergence Crabgrass Herbicides

Common Name	Trade Name	Performance
benefin	Balan	Good
benefin+trifluralin	Team, Team Pro, Frank's Crabgrass	Excellent
dithiopyr	Dimension, Meijer Crabgrass, Spectracide Crab	Excellent
pendimethalin	Scott's Weedgrass, Lesco Pre-M	Excellent
prodiamine	Barricade, Vigoro	Excellent

Soil Temps For Weed Germination At 4 Inch Depth



Crabgrass **53-58 F**

Goosegrass **60-65 F**

Barnyardgrass **60 F**

Foxtails **65 F**

From *Managing Turfgrass Pests*, Watschke et al. and
Best Golf Course Management Practices, McCarty

CRABGRASS DEVELOPMENT



**July- August
Weather
Conditions
Favor
Crabgrass
Growth**



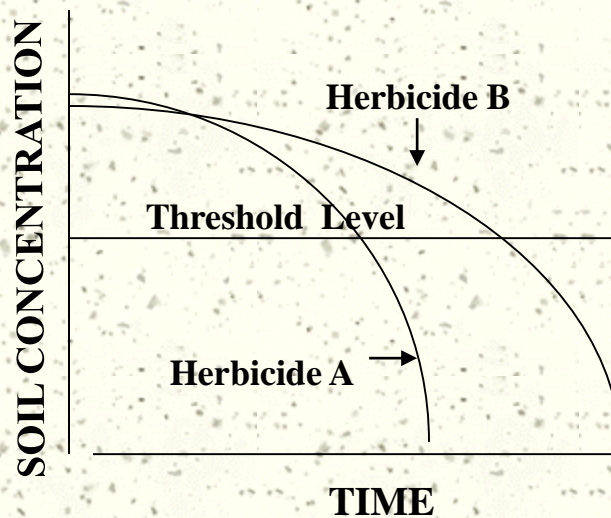
**Heavy Rainfall
During
Crabgrass
Germination Periods
Will Increase Weed
Pressure**

GOOSEGRASS

- **In Central MD
Goosegrass Will
Start To Germinate
In Early May or
When Soil Temp.
Reaches 60 - 65 F
at 4 inches**
- **Germination Can
Occur Throughout
The Season**



PREEMERGENCE CONSIDERATIONS



A) Residual Activity : Will the herbicide provide sufficient residual control during the period of annual grass germination. **Also will there be any interference to fall overseeding due to length of herbicide residual?**

B) Cost

C) Plant phytotoxicity and root pruning effects

D) Type of Formulation and Application Equipment

2014 Mowing Height Study at UMD on a Tall Fescue Turf

Table 4. The effect of mowing height on annual grass encroachment in turf-type tall fescue (no annual grass herbicides applied).

Mowing Height	Annual Grass Coverage
	% coverage (July 23, 2014)
1 inch	85%
2 inch	45%
3 inch	10%
4 inch	1%





Japanese Stiltgrass

Japanese Stiltgrass

Pre-emergent

- If planning soil disturbance, such as aeration, do it before application.
- Apply prior to seed germination which begins, in early spring a couple of weeks before crabgrass seeds germinate.
- Water after application, according to label.
- A second application may be possible, usually 6-8 weeks later (see product label).
- Consult label for specific waiting period between application and overseeding.



Post Emergent Annual Grasses

- Fexoxaprop
- Fluazifop
- Sulfentrazone
- Quinclorac
- Sethoxydim
- Mesotrione



Courtesy Virginia Tech Weed ID Guide

Goosegrass

Post-Emergent Perennial Grasses

- Bermudagrass (wiregrass)
- Nimblewill
- Orchardgrass

- Fenoxaprop
- Fluazifop
- Combined with Triclopyr



Courtesy Virginia Tech

Nimblewill

Traditional Broadleaf Herbicides

- Mixes containing 2,4-D, 2,4-DP, dicamba, mecoprop, or quinclorac.
- Other active ingredients: Penoxsulam, triclopyr, sulfentrazone, carfentrazone
- Ready-to-use formulations are easier to use, don't require mixing
- Best used as a spot spray
- Think twice before using pesticides and **ALWAYS** read and follow label directions

Table 5.9 Broadleaf Weed Control in Bluegrass, Tall Fescue, Perennial Ryegrass, and Common Bermudagrass.

Weed	Classification	Response to Herbicides					Preferred Time to Treat
		2,4-D + dicamba	2,4-D + MCPP	2,4-D + Dicamba+ MCPP	2,4-D + Dicamba+ Triclopyr	2,4-D + Dicamba + Pencoxsulam	
Bedstraw	'A	S	I	R-I	S	I-S	Spring
Bindweed - Field	P	S	I-S	S	S	S	Spring
Hedge	P	S	I-S	S	S	S	Spring
Bittercress	WA	S	S	S	S	S	Fall
Black Medic	SA & P	S	I	S	S	S	Spring & Fall
Buttercup	WA & P	S	S	S	S	S	Spring & Fall
Buttonweed - Virginia	P	R-I	R	R-I	I-S	I-S	Spring Sequentially
Carpetweed	SA	S	S	S	S	S	Spring
Carrot - Wild	B	S	S	S	S	S	Fall
Catsear Dandelion	P	S	S	S	S	S	Fall
Chickweed - Common	WA	S	S	S	S	S	Spring & Fall
Mouseear	WA & P	S	I-S	S	S	S	Spring & Fall
Chicory	P	S	S	S	S	S	Fall
Cinquefoil - Common	A	S	S	S	S	S	Spring
Clover - Crimson	SA	S	S	S	S	S	Spring
Hop	SA	S	S	S	S	S	Spring
White	P	S	S	S	S	S	Spring & Fall
Daisy - Oxeye	P	I	I	I	I-S	S	Spring & Fall
Dandelion	P	S	S	S	S	S	Spring & Fall
Dichondra	P	I-S	I-S	I-S	I-S	I-S	Spring & Fall
Dock	P	I-S	I	I-S	I-S	I-S	Spring
Dogfennel	P	I	R-I	I	I-S	I-S	Spring & Fall
Garlic - Wild	P	I	I	I	I	I	Fall
Geranium - Carolina	WA	S	S	S	S	S	Spring & Fall
Ground ivy	P	I	I	I	I-S	I-S	Spring
Hawkweed	P	I	I	I	I-S	I-S	Fall
Healall	P	S	I-S	S	S	S	Fall
Henbit	WA	I-S	I	S	S	S	Fall
Honeysuckle	P	S	I-S	S	S	S	Spring & Summer
Horsenettle	P	I	R-I	I	I	I	Spring
Horseweed	WA & SA	I-S	I-S	I-S	S	I-S	Spring & Fall
Knapweed	B	I	I	I	I-S	I-S	Fall

From Virginia Cooperative Extension Publication "Pest Management Guide:
Home Grounds and Animals, 2020"

When is the best time of year to
apply broadleaf herbicide?

When is the best time of year to apply herbicide?

Spring- New weeds are smaller, but autumn is generally better for effective broadleaf control

- Flowering landscape plants are more sensitive in the spring
- Weeds are translocating food stores to their roots
- Cooler weather means less volatilization

Nutsedge/kyllinga



- Damp conditions
- Tend to appear in summer
- Active ingredients: Halosulfuron, sulfentrazone

Reading a Pesticide Label



Example Pesticide Label

1 WARNING OR CAUTION STATEMENTS

2 DIRECTIONS FOR USE

3 RE-ENTRY STATEMENT

4 REGISTRATION AND ESTABLISHMENT NUMBERS

5 TYPE OF FORMULATION

6 MISUSE STATEMENT

7 CHILD HAZARD WARNING

8 INGREDIENT STATEMENT

9 NAME OF PRODUCT

10 NAME AND ADDRESS OF MANUFACTURER

11 NET CONTENTS

DIRECTIONS FOR USE

DIRECTIONS: Spray thoroughly on infested plant parts. Repeat as necessary. Can be used up to 3 days of harvest on food crops, unless otherwise specified.

HOUSEHOLD PESTS (Roaches, Ants, Fleas): 2 Tablespoonsful per gallon water. Spray on areas frequented by insects. Avoid contamination of food, dishes, utensils and water. Repeat as necessary. Do not use in food preparation areas or in edible product areas of food processing plants.

VEGETABLES: Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Kale, Beans, Peas, Peatatoes (yukohs, Scapes, Mince, Meatybags): 1 Tablespoon per gallon water. Do not apply to beans within 1 day of harvest. Do not apply to broccoli and peas within 3 days of harvest and to broccol sprouts, cabbage, cauliflower, or kale within 7 days of harvest. Use up to harvest on potatoes.

RE-ENTRY STATEMENT

Do not enter treated areas for 24 hours unless appropriate protective clothing is worn. Because certain states may require more restrictive re-entry intervals for various crops treated with this product, consult your State Department of Agriculture for further information. Do not apply this product in such a manner as to directly or through drift expose workers or other persons. The area being treated must be vacated by unprotected persons.

Written or oral warnings must be given to workers who are expected to be in a treated area or in an area about to be treated with this product. Oral warnings must be given if there is reason to believe that written warnings cannot be understood by workers. All oral warnings are given warnings shall be given in a language customarily understood by workers.

Written or oral warnings must include the following information:

DANGER

Avoid area or field (or person) treated with tranzapon on (or in) case of application. Do not enter without appropriate protective clothing for 24 hours, in case of acute exposure. Get a doctor (physician, clinic or hospital) immediately. Explain that the victim has been exposed to tranzapon and describe his condition. For further information see the STATEMENT OF PRACTICAL TREATMENT portion of the pesticide label.

PRECAUTIONARY STATEMENTS

CAUTION: Harmful if swallowed. Do not breathe vapor or spray mist. Avoid contact with skin; wash skin and hands thoroughly after using. Avoid contamination of food. Tranzapon is a cholinesterase inhibitor and can cause symptoms similar to those caused by other organic phosphate compounds.

If poisoning should occur, CALL A PHYSICIAN IMMEDIATELY. Ask for Physicians Emergency Information call (223) 456-7890.

ATROPINE IS ANTIMIDOTAL.

KEEP AWAY FROM DOMESTIC ANIMALS AND FOODSTUFFS.

NOT FOR STORAGE IN OR AROUND THE HOME.

DO NOT USE, POUR, SPILL OR STORE NEAR AN OPEN FLAME.

DO NOT STORE BELOW 25 DEGREES F.

PROTECT FROM HEAT.

COMBUSTIBLE! KEEP AWAY FROM HEAT AND OPEN FLAME.

This product is highly toxic to bees exposed to direct treatment or residues on crops. Protective information may be obtained from your Cooperative Agricultural Extension Service.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

STORAGE: Store in a cool, dry area.

RESTRICTED DISPOSAL: Pesticide wastes are toxic, flammable, explosive, or corrosive. Do not mix or dump in a ditch or in a stream. If these wastes cannot be disposed of by use according to other instructions, contact your State Pesticide or Environmental Control Agency, or the nearest Waste Management Unit at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Triple rinse. Then offer for recycling or reconditioning, or collect and dispose of in a sanitary landfill, or the other procedures approved by state and local authorities.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

Product #2222
EPA Reg. No. 0009
EPA Est. 111-22-3

TYPE OF FORMULATION

MAKES UP TO 24 GALLONS DILUTED SPRAY

NAME OF PRODUCT

ZAPPO

TRANZIAPON INSECT SPRAY

INGREDIENT STATEMENT

KILLS INSECTS:

- APHILUS
- RED SPIDER MITES
- FLIES
- MEALYBUGS
- SCALES AND HOUSEHOLD PESTS

ACTIVE INGREDIENTS BY WT.

Tranzapon® 49%

Aromatic Petroleum Derivative Solvent . . . 34%

Inert Ingredients 17%

*3.3 Diterpenoidate of clematis pentifolice

CAUTION: KEEP OUT OF REACH OF CHILDREN

See back panel for additional cautions.

NET CONTENTS 8 FL. OZ.

CONTAINS 4.8 LBS. OF TRANZIAPON PER GALLON

NAME AND ADDRESS OF MANUFACTURER

CHEMICO CHEMICAL COMPANY
10000 MAIN STREET
BEAVERTON, MD 54321

Applying Pesticides Safely

- Equipment
 - Separate herbicides, fungicides, insecticides
 - Ready-to-use products eliminate mixing
 - Avoid “hose-end” application equipment
- Mix carefully!
 - Choose a location to reduce impact from spills
 - Use protective equipment
 - Don’t place hose end in pesticide tank

Applying Pesticides Safely

- Avoid damage from drift!!!
 - Avoid windy conditions
 - Use low pressure and a large nozzle
 - Avoid hot weather ($> 80^{\circ}$ F)

Try to “spot spray” or “local spray” instead of blanket spraying

Applying Pesticides Safely

- Cleaning up
 - Triple rinse sprayer and apply to a legal area
 - Never rinse pesticides down the storm sewer!!!
- Pesticide Storage
 - Store in original container in a dry, mild place
 - Plan ahead! Buy only what you need!
 - Triple rinse container and disable before disposal

Safe Herbicide Application

- Don't spray when it's windy
- Don't apply when rain is forecast
- Don't apply when soils are saturated
- Don't walk on until dry or past REI on label

Pesticide Safety Tips

Safety Tips

- Never eat, drink, or smoke while applying pesticides or before cleaning up.
- After applying pesticides, remove your clothes and wash them; then thoroughly wash hands, face, and body.
- Each time you use a pesticide, read the directions!
- Work outdoors with good light and ventilation when mixing or loading pesticides.
- Never mix or apply pesticides on windy days.
- If you splash or spill a pesticide while mixing or loading, stop immediately. Remove contaminated clothing and wash thoroughly. Control, contain, then clean up the spill.

Diseases- Cultural Controls

- Proper fertilization
- Judicious irrigation- Leaf wetness period is key
- Mowing height- 3-3 ½” for cool-seasons, 1-1 ½” for warm-seasons
- Air movement
- Sanitation

Diseases- Biological Controls

- Disease-resistant (tolerant) varieties
- Biological controls

From Virginia Tech “Pest Management Guide: Home Grounds and Animals”

- **Friendly insects, animals, and organisms:** There are a number of commercially available biological fungicides that may reduce the severity of turfgrass diseases. The majority of these products contain beneficial bacteria or fungi. No biological fungicides tested in Virginia provide complete control of turfgrass diseases. However, several fungicides suppressed diseases, such as brown patch and dollar spot, and aided in turfgrass recovery.

Main Lawn Diseases in the Mid-Atlantic

- Brown Patch
- Red Thread
- Summer Patch
- Rust



© 2008 Lane Tredway

Courtesy Dr. Lane Tredway, NC State

Brown Patch

- Major problem of tall fescue, perennial ryegrass, and creeping bentgrass in Mid-Atlantic
- Daytime temps 80's, Night time temps- upper 60's
 - 8-10 hours of high humidity
 - > 6 hours leaf wetness (especially in rainy weather!)

Brown Patch

- Large, irregular shaped areas
- Light brown to straw colored surrounded by dark brown- gray
- Leaf blighting
- Mycelium look “cob-webby” in the morning



Courtesy NC State University

Red Thread

- Fall or Spring disease in cooler weather
- Perennial ryegrass, Fine fescues, Tall fescues
- Presence of pink/red mycelium with red sclerotia at leaf tips → eventually straw colored
- Patches start out circular then become irregular

Red Thread

- Cooler temps in May-June and September-early November
- Symptoms are most noticeable under low fertility conditions
- Favored by periods of high humidity, extended leaf wetness
- Will remain as sclerotia and fungal threads in leaf litter when fungus is not active



Courtesy NC State University

Summer patch



- Root-disease
- Ky. Bluegrass
- Preventative fungicide once soil temps above 60
- Drought symptoms

Rust Diseases of Grasses

- **Rust Diseases: Stem Rust, Stripe Rust, and Leaf Rusts**
- **Favored Host Plants: perennial ryegrass, tall fescue, Kentucky bluegrass, and Zoysiagrass**
- **Conditions Favoring Disease:**
 - **1) Low Nitrogen Fertility**
 - **2) Overcast and cool moist conditions in the Fall and Spring**

Symptoms and Signs

- Early symptoms are light yellow spots on leaves which will eventually lengthen
- Spores (urediopores) are produced inside the leaf lesion and eventually rupture the leaf resulting in orange pustules
- Heavily infected turf will appear thin and weak
- When teliospores (overwintering spores) are produced the lesion areas will turn black in color



Lawn Diseases- Cultural Controls

- Fertility
- Irrigation
- Mowing Height
- Air Movement
- Sanitation

Lawn Diseases- Biological Controls

- Beneficial animals, insects, and organisms
- Disease Tolerant/Resistant Varieties
 - NTEP data and VT / U. of Maryland recommendations.

Table 5.1 - Common Active Ingredients

	azoxystrobin	fluoxastrobin	myclobutanil	propiconazole	thiophanate-methyl
Brown patch	+	+	+	+	+
Dollar spot	-	+	+	+	+
Fairy ring	+	-	-	-	-
Gray leaf spot	+	+	-	+	+
Large patch	+	+	+	+	+
Melting-out/leaf spot	+	+	+	+	+
Microdochium patch (pink snow mold)	+	+	+	+	+
Pythium blight	+	+	-	-	-
Red thread	+	+	+	+	+
Rust	-	-	+	+	+
Spring dead spot	+	+	+	+	-
Summer patch	+	+	+	+	+

- *Active ingredient is (+) or is not (-) labeled for control of disease.*
- *If control level is not satisfactory, additional products are available to certified professional applicators. Refer to PMG Horticulture and Forest Crops.*
- *Concentration of most fungicide active ingredients are much lower than professional products. Application use rates may vary among consumer products. Always carefully read full label instructions before making any pesticide application.*

From VT Publication “Pest Management Guide:
Home Grounds and Animals, 2016”

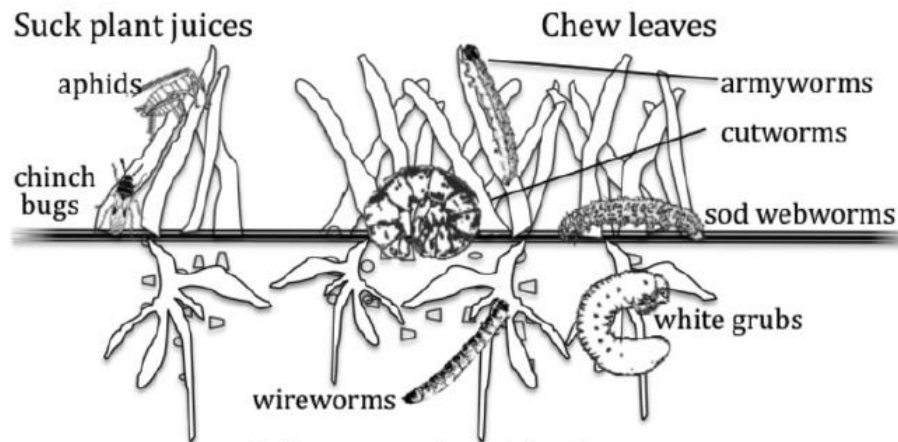
Lawn Insect Pests

Lawn: Insects 5-3

Lawn Insects

Curt Laub, Research Associate, Entomology, Virginia Tech

Above ground feeders



Below ground root feeders

White Grub Damage



Annual White Grub Species

- **Masked Chafers** (North America - N, S, SW, W, SE)
- **Japanese Beetle** (eastern NA)
- **Oriental Beetle** (northeastern NA)
- **European Chafer** (northeastern NA)
- **Asiatic Garden Beetle** (northeastern NA)
- **Green June Beetle** (south-transition NA)
- **May/June Beetles** (southern only)

Grub Complex

Ataenius
Aphodius



May/June Beetle

green June beetle

European chafer

masked chafer

Japanese beetle

Oriental beetle

Asiatic garden beetle

Grub Complex

Ataenia



May/June Beetle

green June beetle

European chafer

Japanese beetle

Masked chafer

Oriental beetle

Asiatic garden beetle

Japanese Beetle Life Stages



egg

1st

2nd
instar larva

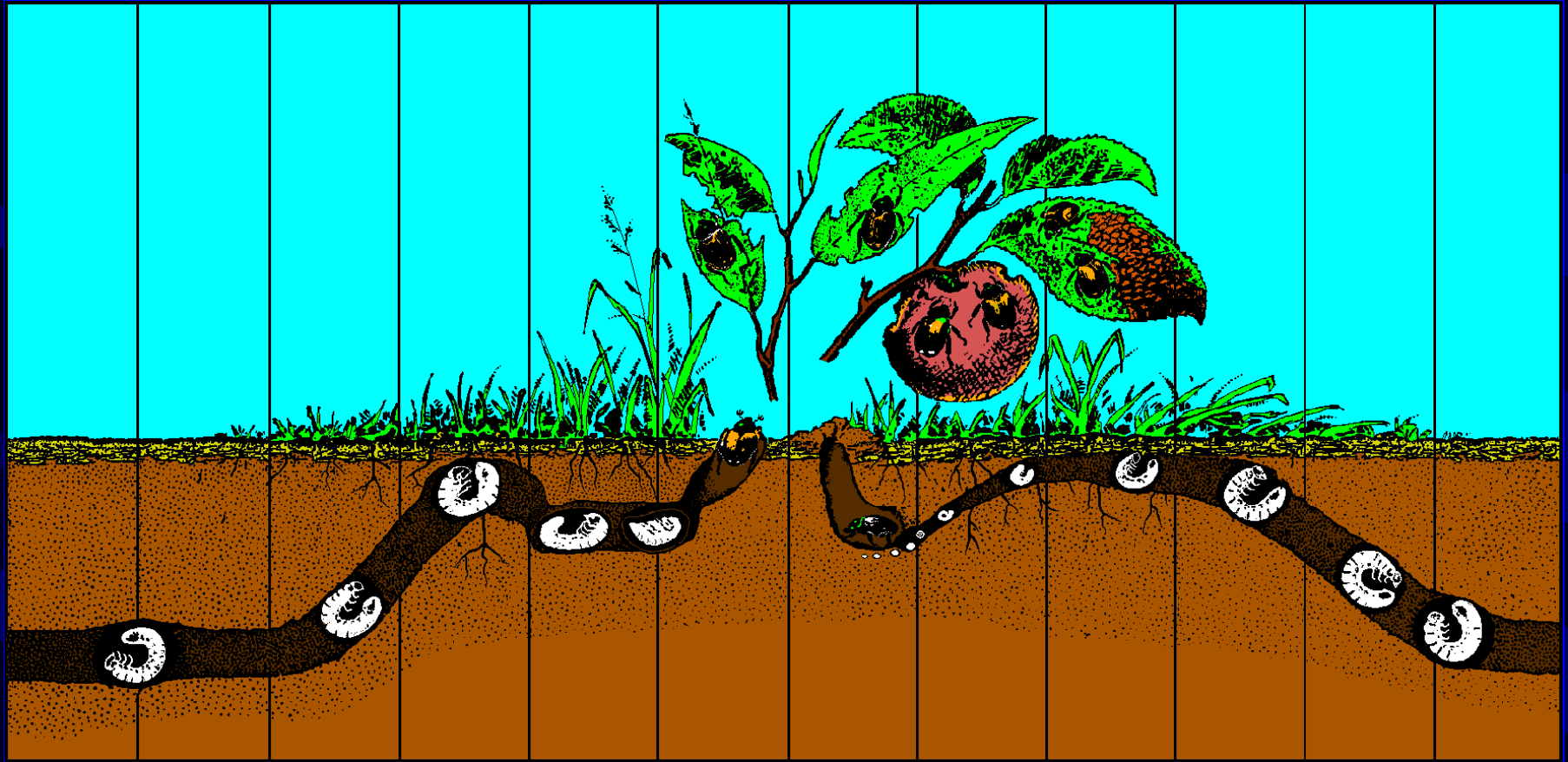
3rd

pupa

adult

Japanese Beetle Annual Cycle

JAN FEB MAR APR MAY JUN JUL AUG SEPT OCT NOV DEC



Lawn Grub Control

VT publication

“Beetlemania- White Grub Control in Lawns”



Figure 13. A soap flush is used to aid in the identification of surface insect pests.



Figure 14. A white grubworm is the larval stage of many forms of beetles that feed on turfgrass roots.

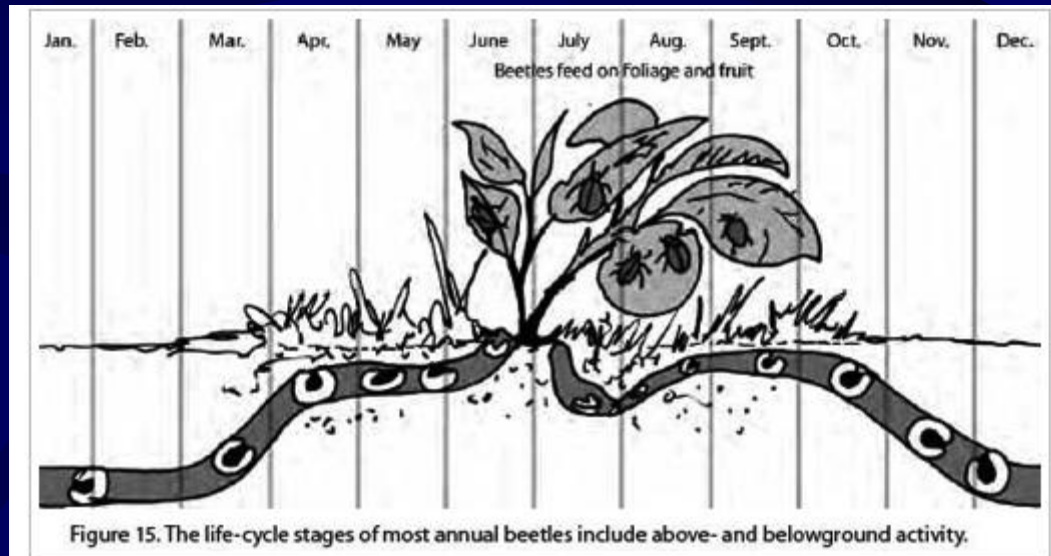


Figure 15. The life-cycle stages of most annual beetles include above- and belowground activity.

Lawn Grubs- Biological Control

- Milky Spore Disease- Slow acting, mixed results
- *Beauveria bassiana*- Insect pathogen
- Entomopathogenic nematodes-
 - Apply only when pest is present
 - Apply later in the day to minimize photodegradation
 - Water before and after application
 - Avoid *Steinernema carpocapsae*

Entomopathogenic Nematodes

- Apply only when pest is present
- Apply when soil temps are above 60° F
- Apply later in the day to minimize photodegradation
- Use *Steinernema riobrave* or *Heterohabditis*

Lawn Grubs- Cultural control

- Tall fescue vs. Ky. Bluegrass
- Balanced fertility
- Drier conditions in very late summer-early fall

Lawn Grubs – Chemical Control

- Chlorantraniliprole- “Softer” conventional pesticide- Needs to be applied early in May
- Bifenthrin
- Carbaryl
- Clothianidin

Lawn Renovation/Rejuvenation

Table 13-D. Seeding: advantages and disadvantages	
Advantages	Disadvantages
Lower initial cost.	Limited time-period for establishment. Seed needs to be sown in late summer to early fall for greatest success rate.
Desired cultivars of turfgrass can be sown.	Daily watering is necessary, sometimes twice a day, depending on weather conditions during initial establishment period.
Less labor and time is required.	Takes a longer time for lawn to become established. Seeded areas need to be restricted from use for up to two months.
Greater flexibility in planting a mixture for specific site conditions (e.g., mixture that performs better in the shade or on high traffic areas can be sown).	Greater chance of weed encroachment during establishment.
	Heavy rain can wash seed away.

Site Preparation

Site preparation is the same for seeding and laying sod. The following steps are crucial for successful lawn establishment. After the lawn is established it is difficult and costly to try to improve the soil.

- 1. Test soil**
- 2. Rough grade.** Rough grading involves removing all debris, including large stones or wood left by construction work. Where topsoil is to be replaced or brought in, grade the area to the contour of the desired finished grade to facilitate uniform distribution of topsoil. Slope the soil away from buildings to prevent water problems. Steep slopes should be terraced, contained with a retaining wall, or planted with a low-maintenance ground cover.
- 3. Lime according to soil test results.** Grass growth will be unsatisfactory if soil pH is not in the 6.0 to 6.8 range. If the soil is too acidic as indicated by a soil test, broadcast

Lawn Renovation

When to Renovate:

- Lawn is >30-40% weeds
- Thatch accumulation = 2”+
- Lawn has been extensively damaged by insects or disease
- Lawn is otherwise an unsalvageable mess

Establishment Timing

- Seeding
 - Optimal window for cool-season:
Late summer- early fall
- Sod
 - Optimal window for cool-season:
Late summer- early fall
Spring is 2nd choice
 - Warm-season: May-mid-July

Sod vs. Seed

Table 13-C. Sod: advantages and disadvantages

Advantages	Disadvantages
Can be installed any time of the year as long as the ground is not frozen and daytime temperatures are below 95 degrees.	Higher initial cost.
Immediate results are obtained and establishment is faster.	Limited choice of turf cultivars.
Quicker erosion control. Can be used successfully in areas prone to soil erosion such as steep banks or culverts.	More labor required for installation.
Fewer problems with weed encroachment.	Not always readily available.

Table 13-D. Seeding: advantages and disadvantages

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Lower initial cost.	Limited time-period for establishment. Seed needs to be sown in late summer to early fall for greatest success rate.
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Less labor and time is required.	Takes a longer time for lawn to become established. Seeded areas need to be restricted from use for up to two months.
Greater flexibility in planting a mixture for specific site conditions (e.g., mixture that performs better in the shade or on high traffic areas can be sown).	Greater chance of weed encroachment during establishment.
	Heavy rain can wash seed away.

Lawn Renovation Steps

- Soil test
- Rough grade
- Lime and basic fertilizer as per soil test
- Incorporate organic matter (rototill)
- Finish grade
- Fertilize with $\frac{1}{2}$ lb. P
- Seed
- Rake lightly
- Topdress with compost
- Keep damp through germination

Lawn Renovation

- Mow as short as possible, then de-thatch, roto-till, or cut sod
 - Work in 10-15% compost. Lime, if needed, based on soil test recommendations.
- Grade/level with topsoil and roll to smooth surface
- Pre-seeding starter fertilizer application must be based on soil test
- Seed, rake in lightly, and mulch with compost to keep moisture in
- Seed— Tall fescue- 6-8 lbs./1,000 ft²
Fine fescue (creeping red or hard fescue)- 3-4 lbs./1,000 ft²

Lawn Renovation

- Topdress using compost to $\frac{1}{4}$ " - $\frac{1}{2}$ " depth to reduce seedbed water evaporation
- Water lightly and frequently to keep the soil surface moist for 10-14 days for germination

Renovation Scalping



Thatch Removal



Seeding Rates for Lawn Establishment



- Tall fescue 6-8 lbs/1000 ft²
- Kentucky bluegrass 2-3 lbs/1000 ft²
- Fine fescue 4-5 lbs/1000 ft²

Maryland Master Gardener Website

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Maryland Master Gardener Program

Our **Vision** is a healthier world through environmental stewardship.

Our **Mission** is to support the University of Maryland Extension mission by educating residents about safe, effective and sustainable horticultural practices that build healthy gardens, landscapes, and communities.

Contact Us

Master Gardener State Program
12005 Homewood Road
Ellicott City, MD 21042

Phone: 410-531-5556 or 410-531-1754

<http://extension.umd.edu/mg#> | 410-531-5567

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The Maryland Master Gardener Program, a volunteer education program taught and administered by University of Maryland Extension (UME), puts research-based knowledge and environmental power into the hands of people who want to create sustainable gardens and landscapes, and protect and improve natural resources. Master Gardeners are citizens from all walks of life who combine their

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- Sun or shade?
- Type of grass?
- Approximate age of lawn?
- When did problem first start? (Weather conditions, etc.)
- Fertilizer regime?

Diagnosing Problems “Remotely”

- Soil type and conditions?
- Disease- stand pattern + leaf signs/symptoms
- Root depth?

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Contact Us

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12005 Homewood Road
Ellicott City, MD 21042

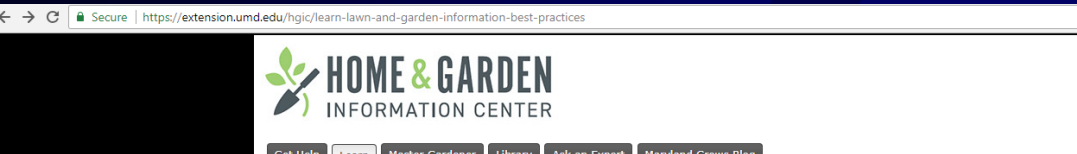
Phone: 410-521-5557

COVID-19 Master Gardener Program Updates 6/2/20



Home and Garden Information Center Website

<https://extension.umd.edu/hgic/learn-lawn-and-garden-information-best-practices>



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SOIL TESTING

Healthy grass does more than provide an aesthetically pleasing backdrop for home landscapes and furnish an area for outdoor activities. Turf forms a dense

Maryland Turfgrass Council Website

<http://www.md-turf-council.org/maryland-resources-and-technical-bulletins>

Maryland Extension Publications and Resources

The Turfgrass Technical Updates (TT-Bulletins) of the University of Maryland's Department of Natural Resource Science and Landscape Architecture are featured here. These are the most current versions of the publications.



New/ Updated

- [TT-116 Nutrient Management Guidelines for Turfgrass Seeding and Sod Installation.pdf](#)
- [Establishment of Lawns With Compost and Microclover In The Chesapeake Bay Watershed.pdf](#)
- [TT-121 Microclover Tall Fescue Lawns in the Mid-Atlantic.pdf](#)
- [TT-120 Amending Soil With Compost to Reduce Stormwater Runoff and Lawn Fertilizer Use.pdf](#)
- [TT-119 Nutrient Management For Athletic Fields.pdf](#)
- [TT-77 Recommended Turfgrass Cultivars For Certified Sod Production And Seed Mixtures In Maryland.pdf](#)

Turfgrass Fertility

- [TT-83 Gypsum Use on Turfgrass.pdf](#)
- [TT-115 Fertilizer Recommendations for Commercially Maintained Lawns in Maryland.pdf](#)

Thank You!

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Lawn Basics & Turf Troubleshooting Q & A – June 16, 2020

1. I would like to know how the groundskeeping “industry standards” compare to your recommendations for lawn care etc - thank you!
 - A. The National Association of Landscape Professionals (www.landscapeprofessionals.org) has certification programs by which a company can become a Landscape Accredited Industry Company and there are different tracks by which professionals can earn "Landscape Industry Certified" recognition for horticulture, lawn care, etc. The emphasis on these programs is more on knowledge of the landscape company/individual and not so much on specific practices. Regionally, there is a program for certifying individuals as Chesapeake Bay Landscape Professionals (cblpro.org) and these guidelines for practices are more stringent and you are more likely to have best management practices implemented. In my mind, the guidelines set by CBLP are the closest thing we have to "landscape standards" in Maryland (beyond our statewide pesticide and fertilizer application laws). For HOA's I usually recommend that the Landscape Committee become familiar with BMP's outlined by CBLP, or, if within Anne Arundel County, the Clean Lawn Care guidelines published by the Watershed Stewards Association, and write standards for maintenance, then find a contractor willing to implement the standards.
 - B. The short answer is that: Yes, there are standards. My sense is that the more "professional" companies know about and implement them; however, there are a lot of smaller companies that do not.
2. What is best fertilizer for one year old zoysia lawn?
 - A. 3 N – 0 P – 2 or 3 K
 - B. Use slow release fertilizer, provides a longer lasting feeding. You can find slow-release fertilizer by checking the label on the bag of the bag. Ideally, you would like to have at least 50% of the total nitrogen as “water insoluble” or “slowly available” nitrogen.
3. Is it best to mow the lawn with or without the bag from spring to summer or should the cuttings be bagged only when it's excessively hot?
 - A. Bag if the lawn was really tall or excessively wet. Otherwise, mulch-mow without the bag. There is no correlation between the heat and the effects of mulch-mowing.
4. Would you mulch all grasses? That is mulch-mow all grasses, including Zoysia.
 - A. Yes, whenever possible try to mulch mow. This includes autumn when you can mulch mow leaves into the lawn to help recycle nutrients and reduce the need to rake/bag leaves.
5. Is the rhizome type of grass (seed) like Titan better than the tiller type here in Maryland?
 - A. Yes because the rhizome will help with density and recovery from stress. Cool-season with rhizomes is Kentucky Bluegrass, but it is more disease prone. Beware, some tall fescues are advertised as “rhizomatous”, but in tall fescue this

is really more “aggressive tillering” than rhizomatous, per se. Kentucky bluegrass has true rhizomes.

6. Have you noticed a change in the types of grass that are doing better due to effects of climate change?
 - A. Zoysia grass looks the best at the time when we are using out lawns most. Dense, low maintenance, disease and pest resistant. Difficult to establish via seed, so it can be expensive to start from sod or sprigs.
 - B. Tall fescue has a new disease we’re seeing here (gray leaf spot) that was only seen in North Carolina but is now being seen in Maryland. This is a late summer disease that can flare up in August. Historically, the weather conditions conducive for gray leaf spot dissipated by mid-September. We may be seeing more gray leaf spot on tall fescue because our region has had warmer Septembers.
7. Are any turf grasses native to Maryland?

A: Zoysia and fescue are not. *Danthonia spicata* – Poverty Oatgrass is native to 46 states including Maryland. You can find it on sides of Appalachian trail. It does well in poor soils. It’s expensive because it is not a good seed producer. I have seen poverty oatgrass seed for sale in the range of \$350-400/lb. and the seeding rate for a lawn is 1 lb. seed/1000 sq. ft. Compared with tall fescue, which is \$3-4/lb. this is price prohibitive for many homeowners.
8. We are told monoculture is bad, so would it be better to several types in your lawn, ie cool and warm season, or other mixes?

A: If you use tall fescue and/or Kentucky bluegrass, it is good to use 3-4 varieties of tall fescue. You can mix in 1-2 varieties of Kentucky bluegrass so that the KBG totals only 10-15% of the mix. This helps encourage recovery as Ky. Bluegrass has rhizomes and tall fescue does not. (We usually warn against 100% Ky. Bluegrass lawns in MD since it is more disease prone and needs more water to look good than tall fescue.) Usually warm season grasses will segregate out, so don’t mix them. You can also mix zoysia and tall fescue to try to have the best attributes of both grasses through the year.
9. How often should a commercial mowing company be sharpening their blades? And does anyone clean their mower between clients so they don’t carry invasive from yard to yard?

A: It would be best if they sharpened frequently and cleaned their blades in between clients, but it is unlikely that they do. Some of the better companies may sharpen their blades once every 1-2 weeks.
10. When you say cut no more than 1/3 of the blade at a time, does that mean you can IMMEDIATELY reset the blade lower and take another pass? How long do you need to wait between passes?

A: Wait at least 4 or 5 days from May -September. A little more leeway in the spring when things are cooler.
11. Should lawns be aerated once a year or every other year?

A: I encourage people to aerate at least every other year. If you can aerate and overseed every year in the fall that would be more ideal.

12. Can I aerate myself or do I hire a pro?

A: You can rent an aerifier from an equipment rental store or a big box hardware store. Consider renting it for one day and having multiple neighbors use it too to save on cost. Typically, the rental cost is \$70-80/day, but splitting this cost between neighbors brings the per household cost down significantly.

13. Is it possible to aerate very sandy soil?

A: You can but if it's very sandy, the need for aerification is much less. Sandy textures provide a lot of air in the soil.

14. Is there some particular guidance to the type of aeration? I seem to recall something like a 3-4" plug?

A: The deeper you can get, the better. 3"-4" would be great for a home lawn. Making sure that moisture in the soil is reasonable and moderate (not too wet or too dry) will help the machine pull the best cores.

15. What is your opinion of Milorganite? Can this be considered near zero P since it is considered bound P. is this slow release of P and N better than chemical fertilizers?

A: Most organic fertilizers have Phosphorous and are slow release. Milorganite is a great product to use. It is a good consistent slow release product.

16. Is it too late to fertilize a Zoysiagrass lawn now?

A: Perfect time for now! Warm season grass should be fertilized sometime between May and August.

17. Are rules for fertilization different for farms vs non-agricultural areas?

A: Yes.

18. What are your thoughts on applying the seed and only practicing aerification?

A: Aerifying and overseeding annually is a great practice since it helps encourages oxygen in the soil and increases turf density. Fertilizing correctly using predominantly slow-release fertilizers will also encourage density. In my experience, lawns that are not fertilized in Maryland typically have off-type grasses and broadleaf weeds encroach eventually.

19. What is best recommendation to fertilize a lawn mixed with Zoysia grass and tall fescue?

A: If you are trying to maintain the current mix or increase the percentage of tall fescue in the stand, fertilize in May, September, and October as per a recommended cool-season schedule. If you are seeking to increase the zoysiagrass percentage, fertilize only once in summer or not at all since this will favor zoysia over tall fescue.

20. Timing to fertilize - if a lawn is dense and healthy, should the spring fertilizer step be skipped?

A: Yes, consider skipping this if the lawn is dense and healthy, although you might still consider applying a 0.5 lb. nitrogen/1000 sq. ft. in May or early June before summer heat really sets in. Focus your fertilizing in September or October.

21. What do you think about "weed and feed" fertilizers?

A: In general, I don't recommend these. One type contains a preemergent and a fertilizer. A lot of these products have a lot of fast-release fertilizer. The time to put down pre-emergent is not a great time to put down fertilizer. Also for weed 'n' feed products that target broadleaf weeds you are treating the whole area with pesticide when you should just "spot spray" the weeds.

22. Is the presence of moss mean anything other than acidic soil? Can I lime based on moss presence without testing for pH?
A: Moss likes acidic soil, low fertility, shade, and damp conditions. Moss does not automatically mean low pH. It's always good to conduct a soil test and lime based upon the actual pH conditions.
23. How do you time fertilizing, over seeding and aerating? What is the order and can you do all in one year?
A: You can do them all in one day. It's best if you have time in September. Aerate first, then fertilize, then seed.
24. Can you please repeat the name(s) for water-insoluble nitrogen?
A: Slowly available nitrogen. Typically, you will see the term "water insoluble nitrogen" on the fertilizer label on the back of the bag.
25. How after you put fertilizer on the lawn, should you wait to cut your lawn?
A: At least one day, perhaps two. You could also mow first, then fertilize within the same day.
26. Will overseeding decrease weeds?
A: Overseeding will help sustain and encourage turf density, which, ultimately, will discourage weeds in the long run. If you have perennial weeds already, overseeding will help density but it won't get rid of the weeds. Depending on the weeds they may reduce in population eventually if conditions are managed to favor grass. Typically, the best way to remove weeds is either by hand weeding or using an herbicide product to spot spray. Products containing iron chelate (Active ingredient: Fe(HEDTA)) are considered a "biorational" and provide an alternative to conventional herbicides.
27. How to aerate where there are large tree roots?
A: Carefully! Can be tough. Avoid large roots. There are tree spades where you can work around tree roots, but arborists usually have these tools. You can also use a hand aerifier in tight spaces around roots.
28. Is fine fescue best for a shady lawn? And does a shady lawn require more fertilizer?
A: Less fertilizer- less photosynthetic capabilities. Fine fescues are best adapted for this, but they still tolerate light shade. For really deep shady areas, a different groundcover is recommended like the native Pachysandra or sedges.
29. Fungus challenges in warm weather with cool-weather fescue/ bluegrass mix
A: The most common fungus on lawns in our area is brown patch, which can cause irregular brown patches of blighting on the leaves. Typically the grass recovers in the fall when weather cools down, however in severe cases stand loss can occur. Culturally, make sure you avoid fast release fertilizers in late spring. You can spray a fungicide containing chlorothalonil or propiconazole preventatively when temperatures are about 70 for lows and mid-upper-80's for highs with high humidity. There are also biorational products like Zio or Rhapsody that have some efficacy. These may be available at professional-oriented stores like Site One.
30. My yard is filled with anthills, more than any previous year. What is going on?
31. My yard is suffering from an ant invasion as well; I don't want to stoop to harmful pesticides but I'm at my wits end!

A: I don't know why there would be more anthills than usual this year. However, if you had a few the last 1-3 years, without control they may have just increased to the point where you notice them more now. There are organic products that can be used for ant control. You can find these on the internet or at a local garden center.

32. Zoysia lawn overrun with violets, about 40% covered by violets.

A: Violets are difficult to control. Wait until the zoysiagrass goes dormant in late October, then spot apply glyphosate to the violets in mid-late November as long as the ground isn't frozen. The glyphosate will kill the green tissue (violets) but should only have minimal (if any) effect on the zoysia. Otherwise, you will need 2-3 applications of a broadleaf herbicide (look for products with the active ingredient quinclorac).

33. Best way to avoid getting brown spots in yard-

A: There are a lot of things that can cause brown spots. Think about the 5 major cultural (maintenance) practices.

34. New fescue lawn is starting to yellow in spots. We did do grubx application about 3 weeks ago.

A: Did you scout for grubs or conduct a "tug test" on the turf to see if the roots were still intact? Also, use a screwdriver, shovel, or soil probe to assess the soil moisture. You may have "localized" dry spots that need extra watering.

35. Is it possible to grow both moss and grass in a lawn?

A: Yes, it all depends on the aesthetic you are seeking. Moss does well in acidic soil, wet and shady conditions, and no fertilizer inputs.

36. What about top dressing with peat moss?

A: I would not use peat moss as a regular topdressing, but I would use it as a topdressing to help retain moisture and aid in germination in a new seeding.

37. Is there specific method to use in adding compost to an established lawn and if the lawn is doing well-fairly dense-is there an advantage to adding compost?

A: There is practically always an advantage to adding compost. However, the amount of compost you add will probably be more nitrogen than is allowed by state regulations.

38. Do you like Milky Spore, and is it effective for grub control?

A: University studies have shown that milky spore has been sporadic for grub control. That said, it may work in a local situation over time. However, it has just been too inconsistent to really recommend it as a good control.

39. Would the addition of too much nitrogen harm the lawn?

A: Too much of a fast release fertilizer causes an imbalance. If you overstimulate growth especially in the late spring the plant is using a lot of carbohydrate reserve to try to push leaf growth at the expense of root growth. Too much fertilizer applied at one time can also cause a "burn" to the leaves since most fertilizers have some amount of salt level in them.

40. There's a lot of noise in the media about 2021 (next year) being a big year for locusts. How badly affected are different areas of MD likely to be? Is there anything we can do to mitigate damage?

A: Do you mean locusts or cicadas? Typically, periodical cicadas don't cause massive amounts of damage, but they can cause some damage to certain trees via the

oviposition (laying eggs) in branches. I haven't heard/read enough about a potential locust boom to be able to comment.

41. What is the best way to top coat a lawn to fill an uneven soil level?

A: It depends how uneven it is. If it's very lumpy and the grade was not done correctly initially, the best way to proceed might be to till up the bumpy section and re-grade. If there are slight differences, you can try to aerify 2-3 times per year and add small amounts of topsoil each time.

42. How to deal with Japanese stiltgrass?

A: Japanese stiltgrass is a summer annual which germinates approximately 2 weeks prior to crabgrass. You can apply a preventative herbicide in early March and this should curb germination. As a reminder, anything you can do to increase the competitiveness of the desirable plants to resist J. stiltgrass invasion will be your best long-term defense. Post-emergent products that control crabgrass like fenoxaprop or quinclorac should also control established stiltgrass, but be sure to always check product labels before using.

43. Best way control Canadian thistle?

A: It depends if it is in pasture or a lawn/landscape situation since the product availability/labelling are different. For lawn/landscape situations products which contain triclopyr or 2,4-D as active ingredients would work. Since Canadian thistle roots grow deeply and the plant spreads by rhizomes, 2-3 applications are often required. Applying in the mid-late fall should yield better control than in the heat of the summer and using a surfactant to help penetrate the leaf cuticle.

44. How to control nimblewill in the lawn?

A: Products containing the active ingredient mesotrione can be used as a selective control against nimblewill. Alternatively, spot spraying with glyphosate should provide more thorough control, but will also kill the grass around it. Apply in mid-late August and re-apply in September, if needed, then re-seed the area.

45. Any ideas on getting rid of yellow nutsedge? I have been handpicking for a couple years with limited success. I know the "nut" is down there and has to be removed, but even when I do, I still get more coming up?

A: Products containing the active ingredients sulfentrazone or halosulfuron can control sedges selectively. Alternatively, if you can tolerate some "collateral damage" you could apply glyphosate to the sedges, then plan on re-seeding the area around Labor Day.

46. How to control clovers?

A: There a variety of selective broadleaf control products to kill clovers. For the long-term, increasing your lawn fertility level will help deter clover encroachment.

47. How do you get rid of Bermuda grass?

A: You can use glyphosate and spot apply if you have patches of Bermuda. If it is interwoven you can still do this but you will have some "collateral damage" on the grass around it. This is probably the best control product. Alternatively, the selective herbicide active ingredient topremazone can be used for 3 bi-weekly applications starting in early August. Typically, this active ingredient is not available to homeowners so it is best to hire a landscape professional for this approach.

48. Do you recommend Dimension or Proscape from Site One?

A: ProScape is a brand that has different product formulations with fertilizer, insecticide, and pre- or post-emergent herbicides, so it depends on which ProScape you are talking about. In general, I would recommend avoiding combination products because the time of year you should be doing one or the other don't often coincide and oftentimes the fertilizer in the combination product is "fast release." For instance, if you apply a pre-emergent + fertilizer combination product for crabgrass control in late March/early April that is usually a good time for crabgrass pre-emergent, but you should be looking to fertilize most in the fall for cool-season grasses.

49. Is dog urine contributing to brown patch in my yard? Will increased watering help or hurt? Anything else I can do other than chasing the dogs?

A: Dog urine is very high in salts and these salts are what "burn" the grass. The best approach is to water the spot (and, thus, dilute the urine) immediately afterwards. (Technically, you could do this within 15 minutes, but you would probably have a tough time re-finding the exact spot again.)

50. How to control Canadian thistle?

A: Answered earlier

Helpful Links Shared During Training:

- [VA Tech IPM Guide](#)
- [Purdue Turf ID](#)
- [Cicada Article](#)
- [Moss in Lawns](#)
- [HGIC Groundcover List](#)
- [HGIC Lawn Pests](#)