HOME LAWN CARE
Using Weeds, Insects and Diseases as Indicators of Turf Problems

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Turfgrasses grow best in full sun and deep, fertile and well-drained soils.
Keep off grass.

Please do not walk on the road. For safety's sake, please walk on the grass!!!

Do not enter lawn rehabilitation.
Primary Cultural Practices (PCP)

1. Mowing
2. Fertility
3. Irrigation
4. Cultivation
5. Pest Management
Primary Cultural Practices

- Mowing
- Irrigation
- Fertilizing
- Cultivation
- Pest Management
Sound Management = Integrated Thinking

Mowing

Irrigation  Fertility
Alabama Mower
The 1/3 rule states…
“never remove more than 1/3 of the turfgrass leaves with a single mowing”

\[ \text{Mow at 1.5”} \]

\[ \text{(Desired mowing height * 1.5)} = \text{mow at height} \]
### Suggested mowing heights for major cool-season turfgrasses

<table>
<thead>
<tr>
<th>Species</th>
<th>Min.</th>
<th>Mow 1</th>
<th>Max 2</th>
<th>Mow 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tall Fescue</td>
<td>1.0</td>
<td>1.5</td>
<td>3.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Perennial Ryegrass</td>
<td>0.25</td>
<td>0.375</td>
<td>3.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Kentucky Bluegrass</td>
<td>0.75</td>
<td>1.125</td>
<td>3.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Creeping Bentgrass</td>
<td>0.10</td>
<td>0.15</td>
<td>0.25</td>
<td>0.375</td>
</tr>
</tbody>
</table>

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1. Mow
2. Height in inches
3. Mow
# Suggested mowing heights for major warm-season turfgrasses

<table>
<thead>
<tr>
<th>Species</th>
<th>Min.</th>
<th>Mow</th>
<th>Max</th>
<th>Mow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greens Bermudagrass</td>
<td>0.10</td>
<td>0.15</td>
<td>0.25</td>
<td>0.375</td>
</tr>
<tr>
<td>Other Bermudagrass</td>
<td>0.5</td>
<td>0.75</td>
<td>3.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Zoysiaagrass</td>
<td>0.375</td>
<td>0.56</td>
<td>3.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Centipede</td>
<td>1.0</td>
<td>1.5</td>
<td>3.0</td>
<td>4.5</td>
</tr>
<tr>
<td>St. Augustine</td>
<td>2.0</td>
<td>3.0</td>
<td>4.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>
Improper Cutting Causes A Drop in Turf Quality

- Dull or out of adjustment mower
- Problem will look worse as grass grows
- Improperly cut grasses can use up to 20% more water
Fertilization
Apply at half rate in two directions.
Yearly Nitrogen Management of Grasses

General Model

Cool-Season

Warm-Season
Water Loss - Evaporation (inches/day)
Penman’s Equation for Saturated Grass
Calculated @ 70F Min/90F Max Temperature
www.weather.nmsu.edu/math/Penman.xls
Weeds as Indicators of Turf Problems
Turfgrass Weeds

“Weeds do not cause bad turf – They are the cause of bad turf!”
Monocots
a.k.a. grasses
Rush Species

Tapertip Rush
*Juncus acuminatus*

Poverty Rush
*Juncus tenuis*

Photos courtesy of Plants Database - USDA: http://plants.usda.gov/java/
Sedges

*Cyperus esculentus*
Sedges

Shortleaf Spikesedge
*Kyllinga brevifolia*

Picture courtesy of Larry Allain @ USDA-NRCS PLANTS Database
Dicots
a.k.a. Broadleaves
Compacted Soil
• Moist, clayey soils are very prone to compaction

• Water infiltration is often as slow as $\frac{1}{10}$th of an inch per hour
Indicator Weeds

Compacted Soil: Crabgrass

Digitaria ischaemum
Indicator Weeds

Compacted Soil: Goosegrass

Eleusine indica
Indicator Weeds

Compacted Soil: Virginia Buttonweed

*Diodia virginiana*
Indicator Weeds

Compacted Soil:

- **Prostrate Knotweed**
- **Common Purslane**
- *Polygonum aviculare*
- *Portulaca oleracea*
Low Nitrogen
Indicator Weeds
Low Nitrogen:

White Clover
Trifolium repens

Black Medic
Medicago lupulina
Poorly Drained Soils
Indicator Weeds

Poor Drainage: Sedges, Rushes

*Cyperus esculentus*

*Juncus sp.*
Indicator Weeds

Poor Drainage: Annual Bluegrass

Poa annua
Indicator Weeds

Poor Drainage: Algae

Photos courtesy of North Carolina State University
Subsurface Drainage
Shade
Indicator Weeds

Shade: Moss

*Bryum argenteum and others*
Indicator Weeds

Shade: Wild Violet
Indicator Weeds

Shade: Heal-all

Prunella vulgaris

Picture courtesy of Forrest and Kim Starr
Indicator Weeds

Shade: Nimblewill

Muhlenbergia schreberi
Indicator Weeds

Shade: Japanese Stiltgrass

*Microstegium vimineum*
Acidic Soil
Relative Nutrient Availability at Varying Soil pH Values

<table>
<thead>
<tr>
<th>pH Value</th>
<th>Nutrient Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0-4.5</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>5.0-5.5</td>
<td>Phosphorus</td>
</tr>
<tr>
<td>6.0-6.5</td>
<td>Potassium</td>
</tr>
<tr>
<td>7.0-7.5</td>
<td>Sulfur</td>
</tr>
<tr>
<td>8.0-8.5</td>
<td>Calcium</td>
</tr>
<tr>
<td>9.0-9.5</td>
<td>Magnesium</td>
</tr>
<tr>
<td>10.0</td>
<td>Iron</td>
</tr>
<tr>
<td></td>
<td>Manganese</td>
</tr>
<tr>
<td></td>
<td>Boron</td>
</tr>
<tr>
<td></td>
<td>Copper and zinc</td>
</tr>
<tr>
<td></td>
<td>Molybdenum</td>
</tr>
</tbody>
</table>

Acidic Soil
Acidic Soil
Indicator Weeds

Acidic Soil pH: Sheep Sorrel (pH 4)

Rumex acetosella
Indicator Weeds

Acidic Soil pH: Ground Ivy

*Puccinia glechomatis*
Indicator Weeds

Acidic Soil pH: Common Cinquefoil

Photo courtesy of North Dakota State University:
http://www.ag.ndsu.edu/
<table>
<thead>
<tr>
<th>Soil pH Values</th>
<th>Relative Nutrient Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0 - 4.5</td>
<td>extreme acidity</td>
</tr>
<tr>
<td>5.0 - 5.5</td>
<td>strong acidity</td>
</tr>
<tr>
<td>6.0 - 6.5</td>
<td>slight acidity</td>
</tr>
<tr>
<td>7.0</td>
<td>slight alkalinity</td>
</tr>
<tr>
<td>7.5</td>
<td>strong alkalinity</td>
</tr>
<tr>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td></td>
</tr>
</tbody>
</table>

- Nitrogen
- Phosphorus
- Potassium
- Sulfur
- Calcium
- Magnesium
- Iron
- Manganese
- Boron
- Copper and Zinc
- Molybdenum
Indicator Weeds

Basic Soil pH: Common Plantain

Plantago major
Detecting Insect Activity in Turf

- Type of damage
- Location
- Time of year
Three Habitat Areas for Insects in Turf
Surface-feeding Insects

*armyworms, chinch bugs, cutworms, sod webworms*

- Large numbers of birds feeding in turf
- Small moths flying zigzag patterns over the turf surface, especially in late evening
- Rapid loss of green color similar to fertilizer burn or drought injury, even though the soil is moist
- Frass on or near the soil surface
Armyworm Damage
Fall Armyworm

Spodoptera sp.
Sod Webworm

Crambus sp.
Black Cutworm

Agrotus sp.
Black Cutworm
Subsurface-feeding Insects

*billbugs, white grubs*

- Turfgrasses shallowly rooted, poor footing
- Damage to turf by insect feeding mammals (moles, skunks and raccoons)
- Overall thinning of turf
- Patches of yellowing turf
Billbug

*Sphenophorus sp.*
Masked Chafer Beetle

Cyclocephala sp.
Green June Beetle

Cotinis sp.
May Beetle

Phyllophaga sp.

Japanese Beetle

Popilla sp.
Moles in the Landscape

Eastern
*Scalopus aquaticus*

Hairy-tailed
*Parascalops breweri*

Star-nosed
*Condylura cristata*

http://blekko.com/ws/moles+lawn+/images
http://www.google.com/imgres?imgurl
Several Diseases of Turf

- Large Patch: *Rhizoctonia* spp.
- Dollar Spot: *Lanzia* and *Mollerodiscus* spp.
- Fairy Ring: *Marasmius* sp., *Lepiota* sp., *Psalliota* sp.
- Pink Snow Mold: *Microdochium nivale*
- Pythium Blight: *Pythium* spp.
- Red Thread: *Laetisaria fuciformis*
- Slime Mold: *Mucilago crustacea*, *Physarum* sp., *Fuligo* sp.
- Spring Dead Spot: *Ophiosphaerella herpotricha*
Large Patch of Bermudagrass at Spring Greenup

• Favored by cool, wet weather in the spring at the time of, or soon after green-up
Dollar Spot

- Often indicates low nitrogen
Fairy Ring

- Favored by an accumulation of organic matter
- Turfgrass plants may die within the ring
- A dark green band may appear on the inside or the outside of the ring of dead turfgrass plants
Pink Snow Mold of Perennial Ryegrass

• Favored by poor air flow and high nitrogen levels
Pythium Blight

- Favored by warm air temperatures, wet weather, poor drainage and standing water
Red Thread of Kentucky Bluegrass

- Favored by poor air flow and low nitrogen levels
Slime Mold

- Favored by warm, wet weather, and moist soil and thatch
- Not considered harmful although may eventually block sunlight and limit photosynthesis
Spring Dead Spot of Bermudagrass

- Favored by a high level of nitrogen fertility in late summer, compacted and poorly drained soil, and excessive thatch
Primary Cultural Practices

- Mowing
- Irrigation
- Fertilizing
- Cultivation
- Pest Management
Thank You
turf.utk.edu