What are the Cultural Practices for Managing Turfgrasses?

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Managing Turfgrasses...

Pest control strategies:

- Cultural practices
- Mechanical controls
- Genetics
- Bio-controls
- Chemical controls
Managing Turfgrasses...

Good cultural practices should reduce turfgrass stress and chemical dependency!

Poor cultural practices can increase potential for pest!
The Cultural Practices...

• Measuring the square footage
• Soil Test
• Select the best turfgrasses
• Mowing
• Fertilization
• Irrigation
• Cultivation
• Over-seeding
• Managing thatch
Measuring Lawns
(Should be a cultural practice)
Soil Testing

• Should be a cultural practice
• Know what **nutrients** are needed: Phosphorus, Potassium, etc.
• Know what the **pH** of the soil is: Do you need to add lime?

Acceptable pH = 6 to 7 for lawns
Optimum pH = 6.4 to 6.8
Managing Turfgrasses...

• Selecting Turfgrasses should be a cultural practice

Multiple, resistant turf cultivars provide stability & resilience
Managing Turfgrasses...

Why do we select the turfgrasses we do?

- Looks good (aesthetics)
- Quality
- Color
- Density
- Texture
- Disease resistance
- Wear tolerance
Selecting Turfgrasses

Data to look at:

- Disease resistance
- Quality
- Drought tolerance
- Traffic tolerance
- Color
- Density
- Texture

http://ntep.org
Rhizomatous Tall Fescues  
(*RTF, RZ LS, SRP*)

- Labyrinth
- Grande
- Grande II
- Barenbrug RTF
- Rhambler SRP
- Turbo RZ
- Spyder LS
- Firecracker LS
- Cezanne RZ
- 3rd Millennium SRP
- Titanium LS
- Sidewinder

[Rhizomatous Tall Fescues](#)
The main goal of the TWCA program is to combat the rising concern of our depleting water resources. To accomplish this goal, the TWCA program is designed to recognize plants and other live goods products in the lawn and garden industry that provide a clear benefit in water conservation.

http://www.tgwca.org/
### Blends

**REVOLUTION TALL FESCUE BLEND**

<table>
<thead>
<tr>
<th>Purity</th>
<th>Kind of Grasses</th>
<th>Germ. Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.56%</td>
<td>Wolfpack Tall Fescue</td>
<td>85% OR.</td>
</tr>
<tr>
<td>24.55%</td>
<td>Crossfire II Tall Fescue</td>
<td>85% OR.</td>
</tr>
<tr>
<td>24.62%</td>
<td>Millennium Tall Fescue</td>
<td>85% OR.</td>
</tr>
<tr>
<td>24.53%</td>
<td>Olympic Gold All Fescue</td>
<td>85% OR.</td>
</tr>
</tbody>
</table>

- 1.54% Inert Matter
- 0.15% Crop Seed
- 0.05% Weed Seed

**Net Wt:** 5 lbs

*Noxious Weeds:* None found

### Mixtures

**ENVIRO BLUE LAWN MIXTURE**

<table>
<thead>
<tr>
<th>Lot Number</th>
<th>25EBM00G</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Pure Seed</th>
<th>Variety</th>
<th>Kind</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.00% Plantation Tall Fescue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35.00% Duster Tall Fescue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.00% Park Kentucky Bluegrass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.00% Virtue Tall Fescue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.16% Inert Matter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.75% Other Crop Seed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.09% Weed Seed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Net Weight:** 5 pounds

*Noxious Weed Seed:* None found per pound

*Test Date:* 8-02
Miracle Grass, well maybe?

- **$19.95/2 lbs**
- **$15.90 S&H**
- **$35.85 Total Cost**

- 39.43% seed, 35% PLS
- 60.57% Inert & other seeds

- **$45.46/lb of seed**
- 2 lbs/500 sqft or 4 lbs/1000 sqft
- Costing $54.95/1000 sqft

**Revolution Tall Fescue Blend**

- **$80/50 lb bag**
- **$1.60/lb x 7 lbs/1000 sqft seed rate**
- Costing $11.20/1000 sqft
Establishment Rates for Turfgrasses

• Blends of turf-type Tall Fescues *(Cool-Season)*
  – Seeding rate: 7-9 lbs/1,000 sqft

• Mixture of turf-type tall fescue (90%) with Kentucky bluegrass (10%) *(Cool-Season)*
  – Seeding rate: 7-9 lbs/1,000 sqft

• Zoysiagrass *(Warm-Season)*
  – Planting rate: 1-2 lbs/1,000 sqft or sprigs (10 bushels/1,000 sqft) or plugs (1 foot centers)
Establishment

Fescue/Bluegrass: Sept/Oct. is best time (little weed pressure, cool nights/rain, six months of root growth before summer stress

Zoysiagrass: May/June
- Sod, plugs, sprigs, seed
- ‘Zenith’, ‘Compadre’ seeded cultivars

Spring Seeding: Late Feb best, April seeding requires control of crabgrass
Establishment

Soil test
Roundup
Seed selection
Seedbed prep
  Seed/Soil Contact
Grade
Fertilizer/Lime
Seed
Rake and roll
Mulch (1 bale/1,000 sq ft)
Water (light & frequent)
Establishment

Mow as soon as grasses reach desired mowing height

Force tillering!

Fertilize

3 weeks
Establishment

Continue mowing

Fertilize

6 weeks
Managing Turfgrasses...

What is the most common cultural practice?
Managing Turfgrasses...

Mowing has major impact on weeds

3.5 inches

1.5 inches
Managing Turfgrasses...

Mowing

Mowing frequently avoids “clumping”. Follow “1/3 rule”.
# Managing Turfgrasses...

<table>
<thead>
<tr>
<th>Turfgrass Type</th>
<th>Mowing Height</th>
<th>Frequency (weekly)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tall Fescue Blend</td>
<td>3 – 4”</td>
<td>1 to 2</td>
</tr>
<tr>
<td>Ky. Bluegrass Blend</td>
<td>2.5 – 3.5”</td>
<td>1 to 2</td>
</tr>
<tr>
<td>Tall Fescue + Ky. Bluegrass</td>
<td>3 – 4”</td>
<td>1 to 2</td>
</tr>
<tr>
<td>Fine Fescues</td>
<td>4”</td>
<td>1</td>
</tr>
<tr>
<td>Zoysiaagrass</td>
<td>1 – 2”</td>
<td>1 to 3</td>
</tr>
<tr>
<td>Buffalograss</td>
<td>3 – 4”</td>
<td>1</td>
</tr>
</tbody>
</table>
Managing Turfgrasses...

Mowing
Managing Turfgrasses...

Other mowing points:

• Mow when the grass is dry
• Mow when the grass is not under stress (i.e. wilting)
• Change your direction of mowing each time you mow
GROWTH OF GRASSES

Cool Season
- Shoots
- Roots

Warm Season
- Shoots & Roots

Feed turfgrasses when they are actively growing!
Irrigation

Signs of wilting

Foot prints & wheel marks visible from wilting

Lacking turgor
Rolled leaves
Blue-green color
Cultivation Practices

- Aerification
  - Coring
  - Solid Tine
- Slicing
- Spiking
- Vertical Mowing
When is best time for cultivation practices?

As with fertilization, aerification should be done when the grass is actively growing.
**Benefits of Cultivation**

- Reduce soil compaction
- Stimulate root growth
- Release toxic gases (CO$_2$), air exchange
- Increase infiltration of water
- Accelerate drying of persistently wet soils
- Improve fertility response
- Incorporate organic matter/compost
- Manage thatch
- Facilitate over-seeding
Core Cultivation/Aerification

- Aeration; aerification
- Hollow tines or spoons
- Extract cores from turf:
  - 0.25-1" diameter
  - 3 to 16 inches deep
Types of Core Aerators

Vertical motion—hollow tines

- Advantages: deepest penetration, least surface interruption
- Disadvantages: relatively slow - 10 min /1000 ft²
- Lawns: use larger diameters (1/2 to 3/4”)
**Types of Core Aerators**

- **Drum-type aerators** - hollow tines or open spoons
  - Advantage: relatively fast
  - Disadvantages: severe surface disruption; shallow penetration
Coring Facilitates Over-seeding

• Holes allow seed to soil contact
  • Hollow tines better than solid
• Spikers and slicers push seed into soil
Solid Tine Cultivation

- No cores removed
- Compaction at sides and bottom of holes
Slicing & Spiking

• V-shaped knives on shaft; 3-4" depth
  • Minimal surface disruption
  • Alleviate midsummer stress on high traffic turf
• Spikes can be used for over-seeding
Vertical Mowing
(Power raking, dethatching)

- Vertically oriented knives on rapidly rotating shaft
- **High set:**
  - Cut stolons/leaves for grain control
  - Pulverize cores
- **Low set:**
  - Remove thatch
- **Very low set:**
  - Over-seeding prep
Reduce & Control Thatch

Thatch - loose layer of living and dead organic tissue between foliage and soil surface

• Problems with thatch:
  • Insects: Chinch bug, cutworm
  • Diseases: Patch diseases
  • Shallow rooting
  • Pesticide adsorption
  • Fertilizer sink
  • Water barrier
  • Scalping
Managing Turfgrasses...

Over-seeding:
- Over-seed frequently to maintain turf density
- Provide good Seed/Soil contact
- Over-seeding rates can be less than a normal seeding rate
Managing Turfgrasses

Pest

• Weeds
• Diseases
• Insects

Know why they exist?
Weeds of Turfgrasses

Primary reason they exist?

- Grasses
- Broadleaves
- Sedges
Weeds of Turfgrasses

Annuals:
• Germinate from seed, grows, matures and dies in less than 12 months
• Summer annual grasses & broadleaves
• Winter annual grasses & broadleaves

Biennials:
• Require two years to develop. Grow vegetatively the first year, flowering the second year.

Perennials:
• Live more than two years.
Common Conditions that Promote Weeds

Compaction:
- Annual bluegrass
- Goosegrass
- Knotweed
- Spurge
Common Conditions that Promote Weeds

**Drought conditions:**

- Black medic
- Cinquefoil species
- Crabgrass
- Curly dock
- Goosegrass
- Spurge
- Speedwell
- Yellow wood sorrel
Common Conditions that Promote Weeds

Low pH:

- Common mullein
- English daisy
- Hawkweeds
- Knawel
- Red sorrel
- Wild strawberry
Common Conditions that Promote Weeds

**High pH:**
- Broadleaf plantain
- Hop clover
- Wild carrot

**Shade:**
- Chickweeds
- Speedwell
- Wild violets
Common Conditions that Promote Weeds

**Low nitrogen:**
- Black medic
- Clover species

**High nitrogen:**
- Annual bluegrass
Common Conditions that Promote Weeds

**Poor drainage:**
- Barnyardgrass
- Buttercups
- Nutsedge
- Plantains
Managing Turfgrasses...

Weed Management:

- Selecting turfgrasses
- Mowing height
- Over-seeding for density
- Soil conditions (compaction, pH, moisture, etc.)
- Fertility
- Pre-emergence herbicides often over-used
Managing Turfgrasses...

**Disease Management:**
- Select resistant cultivars
- Reduce stresses (healthy plants, nutrients, water, environmental)
- Mow with sharp blade
- Maintain biologically active soils
- Fungicides reduce beneficial fungi & microbes
Pests Identification

Insect Life Cycles

Complete Metamorphosis

Insect Life Cycle

Incomplete Metamorphosis
Turfgrass Insects with White Grubs

- May/June beetle
- Southern masked chafer
- Green June beetle
- Black turfgrass ataenius
- Billbugs
- Japanese beetle

Root pruners, sub-surface feeders
White Grubs

Biology

Emerge Late May, June, & early July to feed for approximately 60 days
White Grubs

May/June Beetle

*Phyllophaga spp.*

**Biology:**
- Three year life cycle
- Females lay 20-50 eggs in a lifetime
- Prefers moist soil for egg laying
- Eggs hatch in 3-4 weeks
- Larvae feed first two summers
- 3rd instar larvae feed into fall
- Adults are defoliators

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White Grubs

May/June Beetle

Damage:
Adult beetles feed on:
• Oak  Elm
• Hickory  Poplar
• Walnut  Birch
• Persimmon
White Grubs

Masked Chafer
*Cyclocephala spp.*

**Biology:**
- One year life cycle
- Lay eggs singly or small clusters
- Prefers moist soil for egg laying
- Eggs hatch in 14-18 days
- Molt to 2\textsuperscript{nd} instar in 3 weeks
- Over-winter below frost line
Japanese Beetle

Biology

Female Beetles:
- Feeds then lays a few eggs in moist soil
- Repeats process until all eggs are laid
- Each female lays 40 to 60 eggs
- New larvae emerge in two weeks
- Feed on roots and organic matter
- Overwinter as 3\textsuperscript{rd} instar
White Grub Damage

White Grub

Damage:

Late July – early August

5 – 10 per sqft
Summer Drought Issues

Can lead to...

“Covert” White Grubs

Any indicators?
White Grubs

Control:
- chalofenozone (Mach-2)
- imidacloprid (Merit)
- clothianidin (Arena)
- chlorantraniliprole (Acelepryn)
- carbaryl (Sevin)
- trichlofon (Dylox)
- Heterorhabditis spp. (Grub Away, Biostrike Hb)

Need watering in (see labels)
Japanese Beetle

Chemical Control

Pyrethroids:

- cyfluthrin (Tempo)
- bifenthrin (Talstar)
- deltamethrin (DeltaGard)
- lambda-cyhalothrin (Scimitar)

- Provide 2 to 3 weeks protection
Japanese Beetle

Chemical Control

Carbaryl (Sevin):
• Provides only 1 to 2 weeks protection
• Works on adults and larvae

Chlorantraniliprole (Acelepryn)
Sod Webworm

*Crambus patella*

**Biology:**
- Adults resemble sliver of wood
- Females drop eggs over turf in flight
- Lay 60 eggs/night, several 100 during lifetime
- Hatch in 7 days, life cycle in 6-10 weeks
- 2-3 generations per year
Sod Webworm

_Crambus patella_

Damage:

- Look for chewed leaf blades
- Pencil-sized holes
- Silken-lined retreats
- Use soap test
- 10-15 larvae/sq yd
Sod Webworm

*Crambus patella*

**Control:**

Pyrethroids –

- bifenthrin (Talstar)
- deltamethrin (DeltaGard)
- lambda-cyhalothrin (Scimitar)
- carbaryl (Sevin)
- halofenozide (Mach2)
- chlorantraniliprole (Acelepryn)

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Fall Armyworm

*Spodoptera frugiperda*

**Biology:**
- Moths mainly active at night
- Y-shaped marking on head
- Females lay 3-5 eggs masses, 1000 eggs
- Eggs hatch in 7-10 days
- Larvae feed aggressively at first
- Feed and move like an army to new food sources – feeds on entire plant
- 23-28 days per generation
Fall Armyworm

*Spodoptera frugiperda*

Damage: 1 larva/sq yd
Fall Armyworm

*Spodoptera frugiperda*

Control:
- Early scouting and soap drench for early detection
- Spot treat on “as needed” basis
- Liquid applications best, avoid mowing & irrigation
- Insecticides:
  - carbaryl (Sevin)
  - halofenozide (Mach2)
  - lambda-cyhalothrin (Scimitar)
  - chlorantraniliprole (Acelepryn)
Managing Turfgrasses...

Insect Management:

• Reduce stress
• Take advantage of natural defense systems (terpenes/terpenoids)
• Use endophyte enhanced turfgrasses
• Reduce thatch
• Insecticides reduce beneficial, predatory insects

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University of Missouri
Managing Turfgrasses...

Questions?
Managing Turfgrasses...

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