So you have a mess!
Now what do you do?
Overview

• Selecting the Right Turfgrass
  – The pros and cons of available options

• Establishing/Reestablishing Your Lawn
  – To sod or not to sod?

• Irrigation or irritation
  – PVC pipes are no match for fallen trees!

• Fertilizing Damaged Turf
  – Don’t add insult to injury!
Overview

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Selecting the Right Turfgrass

• What type of lawn is desired or expected?
  – Better Homes and Garden Showcase?
  – Average lawn?
  – Parking area?
Bahiagrass
Bahiagrass Development

Funded by:

USGA
Bahiagrass

• Advantages
  – Excellent drought tolerance
  – Low fertility requirements
  – Low maintenance
  – Tolerant of sandy, infertile soils
  – Establishes from seed

• Disadvantages
  – Produces abundance of seedheads
  – Open growth habit encourages weed competition
  – Susceptible to mole crickets
  – Coarse stems are difficult to mow
  – Not wear tolerant
Bermudagrass
Bermudagrass

**Advantages**
- Vigorous, light to dark green, dense turf.
- Well adapted to most soils and climatic regions in Florida.
- Excellent wear, drought, and salt tolerance.
- Establishes rapidly.

**Disadvantages**
- Large number of cultural and pest problems
- Dormant bermudagrass must be overseeded to maintain year-round green color.
- Low shade tolerance.
Bermudagrass Cultivars

- **Tifway (419)** – fine textured; dark green color, and forms few seed heads.
  - Most widely used bermudagrass.
- **TifGrand** - Tolerance of 60% to 70% shade.
- **Celebration** – a selection of common bermudagrass from Australia.
- **TifTuf** – newest drought tolerant variety from the University of Georgia.
- **Seeded Varieties** – Many new varieties being tested and many on the market.
  - NuMex Sahara, Yuma, Princess 77.
Celebration Bermudagrass
TifGrand Bermudagrass
SAVE WATER
SAVE MONEY
supersod.com
DT-1 (‘TifTuf’) “Selected” in 2001
Nematode Infested Site

TifTuf

Celebration

Latitude 36

Tifway
Cool Season Grasses

- Bentgrass - Fairway/Tee
- Bentgrass - Putting Green
- Fineleaf Fescue
- Ky. Bluegrass - High Input
- Ky. Bluegrass - Low Input
- Perennial Ryegrass
- Tall Fescue
- Cool-Season (Low Input)
- Cool-Season (Drought)

Warm Season Grasses

- Bermudagrass
- Buffalograss

NTEP Bermudagrass Tests

2013 National Bermudagrass Test
- 2013-17 Data - Final Report
- 2017 Data - Progress Report
- 2016 Data - Progress Report
- 2015 Data - Progress Report
- 2013-14 Data - Progress Report

2007 National Bermudagrass Test
- 2007-12 Data - Final Report
- 2012 Data - Progress Report
- 2011 Data - Progress Report
- 2010 Data - Progress Report
- 2009 Data - Progress Report
- 2008 Data - Progress Report
- 2007 Data - Progress Report

2002 National Bermudagrass Test
- 2003-06 Data - Final Report
- 2006 Data - Progress Report
- 2005 Data - Progress Report
- 2004 Data - Progress Report
- 2003 Data - Progress Report

1997 National Bermudagrass Test
- 1997-2001 Data - Final Report
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1/ TO DETERMINE STATISTICAL DIFFERENCES AMONG ENTRIES, SUBTRACT ONE ENTRY'S MEAN FROM ANOTHER ENTRY'S MEAN. STATISTICAL DIFFERENCES OCCUR WHEN THIS VALUE IS LARGER THAN THE CORRESPONDING LSD VALUE (LSD 0.05).

2/ C.V. (COEFFICIENT OF VARIATION) INDICATES THE PERCENT VARIATION OF THE MEAN IN EACH COLUMN.
Centipede grass
Centipede grass

Ground Pearls – no control options available
Centipedegrass Decline
The Mystery of the Yellowing Centipedegrass Home Lawn......
Spittlebug Injury
Centipedegrass Cultivars

• Common (yellow or red stem)
  – Most commonly found

• TifBlair (Georgia release)
  – Cold tolerance claims
Seashore Paspalum
Seashore Paspalum
Seashore Paspalum
Seashore Paspalum

- UF currently doesn’t recommend Seashore paspalum for average home lawns due to the management complexities.
Gray Leaf Spot in St. Augustinegrass
Large Patch in St. Augustinegrass
Large Patch Activity Assessment
Five Year Soil Temp Average for Alachua Co. FL

brown patch + leaf and sheath spot

Temperature F

86.0
82.4
78.8
75.2
71.6
68.0
64.4
60.8
57.2
53.6
50.0

Date

3/11
5/3
10/11
11/3
11/21

3/11
4/5
11/21
Take-all Root Rot in St. Augustinegrass
Chinch Bugs

Piercing/Sucking Insects
Chinch Bugs

Floratam
Tropical Sod Webworm Damage
Tropical Sod Webworm Larvae
St. Augustinegrass Cultivars

• **Bitterblue** - fine textured, blue-green color

• **Floratam** - 1973 release. Coarser than Floratine. 75% sod in Florida. Resistant to SAD but no longer to chinch bugs in Florida.

• **Seville** - Dwarf with salt and shade tolerance, SAD resistance, BUT very susceptible to chinch bugs.

• **Raleigh** - Cold tolerant from NCSU. Turns yellow in hot summer, susceptible to chinch bugs and GLS.
St. Augustinegrass Cultivars

• **Palmetto** - cold tolerant.
• **Sapphire** - newest release from Sod Solutions, Inc.
• **Classic** - proprietary release from Woerner Turf.
  – Claims of cold tolerance.
• **Captiva** – release from the University of Florida.
• **CitraBlue** – latest release from the University of Florida.
• **ProVista** – new release from The Scotts Company
St. Augustinegrass Cultivars

• **ProVista** – new release(s) from The Scotts Co. and marketed by Bethel Farms.

ProVista™ St Augustine is ready in Florida ProVista turf grows at half the rate of Floratam, mowing down to 20x annually, significant savings year-after-year. For pennies more than Floratam, owners can see ROI in as little as 11 months. ProVista complete weed control, Greenlight is a glyphosate herbicide approved to spray directly on ProVista to kill both grassy and broadleaf weeds, including Bermuda/ Carpetgrass, no damage to ProVista. We look forward to show you the future of turf with ProVista!
ProVista St. Augustinegrass

Reduce Your Largest Cost While Achieving Superior Results

*Labor is the most significant issue preventing landscapers from growing and making a profit. ProVista enables landscapers to deliver a premium landscape with significantly less labor and cost.

Typical Share of Spending

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<th>Service</th>
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<tr>
<td>Fert &amp; Weed Control</td>
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<td>Other Maintenance</td>
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<tr>
<td>Mowing</td>
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*Based on Scotts Proprietary Market Research.
Have a Premium Landscape with Significantly Less Labor and Cost.

An innovative solution delivering beautiful turf with complete weed control and half the mowing.

Contact Us
Zoysiagrass
Species of Zoysiagrass

- Z. japonica
- Z. matrella
- Z. pacifica
Zoysia japonica

El Toro, JaMur, Empire, Palisades, UltimateFlora, Zenith and Icon,

- Coarse leaf texture
- Less dense and less thatch than *matrella* species
  - Good homeowner species
- Good shade tolerance
  - Variation among cultivars
- Good drought tolerance
  - Variation among cultivars
- Good rate of establishment
  - True for most newer cultivars
- Large patch disease response
  - All cultivars are susceptible
- Mowing heights: < 2.0”
- Empire is the most widely available and has become the standard for zoysiagrass in Florida.
Zoysia matrella
Zeon, Taccao Green/PristineFlora, Geo, Carribean, L1-F and Diamond
- Very Fine to Fine leaf texture
- Extremely Dense and prone to thatch
  - Typically high maintenance landscapes
  - More susceptible to scalp damage
- Very good shade tolerance
  - Variation among cultivars
- Dense rhizome systems
- Less drought tolerant compared to japonica cultivars.
- Less winter hardy than japonica
- Better winter color retention than japonica
- Slow establishment
- Large patch disease response
  - All cultivars are susceptible
- Mowing heights:
  - Landscape use: 0.5” to 1.5”
    - Under shade: up to 1.5” (depends on cultivar)
- None are in widescale use or production in Florida
- Zeon was the cultivar used in Rio for the Olympic golf tournament.
El Toro

this slide Courtesy Brian Schwartz, UGA
JaMur
Empire
Empire
Palisades
Palisades
Taccoa Green/PristineFlora
Taccoa Green/
PristineFlora
Zenith Zoysiagrass

- A seeded zoysiagrass variety available in retail stores.
- Fast establishment.
Zenith Zoysiagrass

8 weeks after seeding
Large Patch – Major Issue
(Rhizoctonia)
Pest Moths

Tropical sod webworm
Wingspan: ½ to 1”

Fall armyworm
Wingspan: ~ 1½”

Striped grass looper
Wingspan: 1½”
Billbugs (*Sphenophorus* spp.)

- Gray to black weevils
- Larvae are legless
- Hunting billbug has a Y-shaped area on pronotum with a parenthesis-like marking on each side
- Possibly 2+ generations each year in Florida
Scarab Beetles
(Coleoptera: Scarabaeidae)

• Dung beetles and plant-feeders (1400 N. American species)
• Scarabs vary in size, color, and habits, but adults can be recognized by their 3-segmented, clubbed antennae
• Larvae molt 3 times (have 3 instars)
Masked Chafers
*Cyclocephala* spp.

May/June Beetles
*(Phyllophaga* spp.)*

Green June Beetle
*(Cotinis nitida)*
Zoysiagrass Drought Response

2 Days

4 Days

6 Days

9 Days

12 Days

15 Days
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<th>Grass Type</th>
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<th>Bermudagrass</th>
<th>Centipedegrass</th>
<th>St. Augustinegrass</th>
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## Optimal Mowing Practices

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<tr>
<td>Height of Cut</td>
<td>3 – 4”</td>
<td>1 – 2”</td>
<td>1.5 – 2.5”</td>
<td>2 – 4” (cultivar dependent)</td>
<td>0.25 – 2.5” (cultivar dependent)</td>
</tr>
<tr>
<td>Quality of Cut</td>
<td>Poor</td>
<td>Moderate</td>
<td>Good</td>
<td>Moderate</td>
<td>Poor</td>
</tr>
</tbody>
</table>
# Shade Tolerance

<table>
<thead>
<tr>
<th></th>
<th>Bahiagrass</th>
<th>Bermudagrass</th>
<th>Centipedegrass</th>
<th>St. Augustinegrass</th>
<th>Zoysiagrass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Poor</td>
<td>Fair</td>
<td>Good</td>
<td>Good</td>
<td>Fine-textured appear to be better</td>
</tr>
<tr>
<td>New cultivars have improved shade tolerance</td>
<td>Dwarf-types are better.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

New cultivars have improved shade tolerance.
## DLI Requirements

<table>
<thead>
<tr>
<th>Turfgrass Cultivar</th>
<th>Summer</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tifway hybrid bermudagrass</td>
<td>21.0</td>
<td>10.6</td>
<td>17.9</td>
</tr>
<tr>
<td>TifGrand hybrid bermudagrass</td>
<td>19.9</td>
<td>9.8</td>
<td>14.6</td>
</tr>
<tr>
<td>Celebration common bermudagrass</td>
<td>19.6</td>
<td>8.8</td>
<td>14.9</td>
</tr>
<tr>
<td>Argentine bahiagrass</td>
<td>15.3</td>
<td>7.2</td>
<td>10.2</td>
</tr>
<tr>
<td>TifBlair centipedegrass</td>
<td>13.4</td>
<td>9.5</td>
<td>14.1</td>
</tr>
<tr>
<td>SeaDwarf seashore paspalum</td>
<td>13.2</td>
<td>8.0</td>
<td>11.9</td>
</tr>
<tr>
<td>Floratam St. Augustinegrass</td>
<td>11.8</td>
<td>8.5</td>
<td>11.6</td>
</tr>
<tr>
<td>Diamond zoysiagrass (matrella)</td>
<td>11.3</td>
<td>7.4</td>
<td>10.9</td>
</tr>
<tr>
<td>Palisades zoysiagrass (japonica)</td>
<td>11.2</td>
<td>8.2</td>
<td>11.2</td>
</tr>
<tr>
<td>Captiva St. Augustinegrass</td>
<td>10.9</td>
<td>8.0</td>
<td>11.5</td>
</tr>
<tr>
<td>Pristine zoysiagrass (matrella)</td>
<td>10.8</td>
<td>7.3</td>
<td>10.6</td>
</tr>
<tr>
<td>JaMur zoysiagrass (japonica)</td>
<td>10.3</td>
<td>6.8</td>
<td>10.5</td>
</tr>
</tbody>
</table>
# Insect Problems

<table>
<thead>
<tr>
<th>Primary Insect Problems</th>
<th>Bahiagrass</th>
<th>Bermudagrass</th>
<th>Centipedegrass</th>
<th>St. Augustinegrass</th>
<th>Zoysiagrass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mole Cricket</td>
<td>Mole Crickets</td>
<td>Spittle Bugs</td>
<td>Chinch Bugs</td>
<td>Billbugs</td>
</tr>
<tr>
<td></td>
<td>Ground Pearls</td>
<td>Webworms</td>
<td>Ground Pearls</td>
<td>Webworms</td>
<td>Webworms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Armyworms</td>
<td>Webworms</td>
<td></td>
<td>Mole Crickets</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White Grubs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Disease Problems

<table>
<thead>
<tr>
<th></th>
<th>Bahiagrass</th>
<th>Bermudagrass</th>
<th>Centipedegrass</th>
<th>St. Augustinegrass</th>
<th>Zoysiagrass</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Disease Problems</strong></td>
<td>Dollar Spot</td>
<td>Leaf Blights Dollar Spot</td>
<td>Centipede Decline Large Patch</td>
<td>Take-All Root Rot Large Patch Gray Leaf Spot</td>
<td><em>Large Patch Dollar Spot Rust</em></td>
</tr>
<tr>
<td>Nematodes</td>
<td>Uncommon</td>
<td>Common</td>
<td>Occasional</td>
<td>Occasional</td>
<td>Occasional</td>
</tr>
</tbody>
</table>
# Herbicide Options

<table>
<thead>
<tr>
<th></th>
<th>Bahiagrass</th>
<th>Bermudagrass</th>
<th>Centipedeagrass</th>
<th>St. Augustineagrass</th>
<th>Zoysiagrass</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grassy-Weed Herbicides</strong></td>
<td>PRE: Many</td>
<td>PRE: Many</td>
<td>PRE: Many</td>
<td>PRE: Many</td>
<td>PRE: Many</td>
</tr>
<tr>
<td></td>
<td>POST: Few</td>
<td>POST: Many</td>
<td>POST: Few</td>
<td>POST: NONE</td>
<td>POST: Many</td>
</tr>
<tr>
<td><strong>Broadleaf Weed Herbicide Tolerance</strong></td>
<td>Many are damaging</td>
<td>Most are safe</td>
<td>Many are damaging</td>
<td>Many are damaging</td>
<td>Most are safe</td>
</tr>
</tbody>
</table>
Overview

• Selecting the Right Turfgrass
  – The pros and cons of available options

• Establishing/Reestablishing Your Lawn
  – To sod or not to sod?

• Irrigation or irritation
  – PVC pipes are no match for fallen trees!

• Fertilizing Damaged Turf
  – Don’t add insult to injury!
Warm-season grasses

• Best time to establish in spring or summer
• Winter dormancy induced due to lower temperatures and reduced daylength
• Most establish vegetatively (sod, sprigs, stolons, rhizomes)
Turfgrass Establishment

Sequence of Events

- Clean and Rough Grade
- Soil Analysis
- Install Irrigation Equipment
- Soil Amendments
- Deep Tillage
- Final Grading
- Planting
- Irrigation
- Post-planting Care
Establishment Methods

<table>
<thead>
<tr>
<th>Bahiagrass</th>
<th>Bermudagrass</th>
<th>Centipedeagrass</th>
<th>St. Augustineagrass</th>
<th>Zoysiaagrass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed Sod</td>
<td>Seed Sprigs</td>
<td>Seed Plugs Sod</td>
<td>Plugs Sod</td>
<td>Seed Sprigs Sod</td>
</tr>
<tr>
<td></td>
<td>Plugs Sod</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCOTTS® TURF BUILDER® GRASS SEED
QUICK FIX® MIX
GRASS SEED MIXTURE

PURE SEED
87.89% GULF ANNUAL RYEGRASS
8.77% BRIGHTSTAR SLT PERENNIAL RYEGRASS*

OTHER INGREDIENTS
1.75% INERT FROM SEED
0.50% OTHER CROP SEED
0.09% WEED SEED
NOXIOUS WEED SEEDS: NONE FOUND

GERMINATION 90% ORIGIN OR
ORIGIN

NOTES
*PVP PROTECTED VARIETY-UNAUTHORIZED PROPAGATION PROHIBITED

NET WT 3 LB (1.36 KG)

LOT NO. 19020147
TESTED: OCT. 2018 SELL BY: JAN. 31, 2020
IN AL, AR, FL, GA, HI, IA, KS, LA, MO, MS, NM, OK,
RI, TN, TX, WV, SELL BY: JUL. 31, 2019

THE SCOTTS COMPANY
14111 SCOTTS AVE. ROAD
MARYSVILLE, OH 43041

AMS:661  18272-2

Turfgrass Science
Grass Seed
Fast Grass Mix
Best for Quick Cover

Vigoro

GERMINATION ORIGIN
28.09% GULF ANNUAL RYEGRASS 30% OREGON
24.87% BB-MEX-1 ANNUAL RYEGRASS 30% OREGON
19.88% PANTERRA V ITALIAN RYEGRASS * 30% OREGON
14.88% TERRABAR ITALIAN RYEGRASS 90% OREGON
09.75% PREMIER II PERENNIAL RYEGRASS * 85% OREGON
08.67% OTHER CROP SEED AMS 400
01.80% INERT MATTER
00.06% WEED SEED * U. S. PROTECTED VARIETY
NOXIOUS WEED SEED PER POUND: 9 ANNUAL BLUEGRASS
UNDESIRABLE GRASS SEED PER POUND: 9 ANNUAL BLUEGRASS
TEST DATE: 1/19 IN CA,IL,IN,MD,PA,MN,NJ,VA,WA,WA,ROSELL SD,
SELL BY 9 MONTHS FROM TEST DATE IN: FL
SELL BY 7 MONTHS FROM TEST DATE IN: DE,MI,MN,NE,SD
SELL BY 10 MONTHS FROM TEST DATE IN: AZ,ID,NM,ND,OH,SC,VT,WA,WA,
SELL BY 12 MONTHS FROM TEST DATE IN: AK,NV,OR,UT
BARENESS: USG USA
P.O. BOX 239
TANGENT, OR 97388
1. PREP • PREPARE
Prepare the area where you want to establish new plug plants or repair bare areas (where gaps between live plants are 12” or less) by removing dead grass and loosening hard soil.

2. APPLY • APLIQUE
Evenly apply EZ Patch Lawn so the area is covered and ground is visible. Use half for thin areas.

Aplique EZ Patch Lawn Repair de manera uniforme para cubrir el área, sin dejar nada de telaraña a la vista. Use la mitad para las áreas más delgadas.

**Scotts® EZ Patch™**
Lawn Repair for St. Augustine Lawns 2-0-0

**GARANTEED ANALYSIS**

- **Total Nitrogen (N)**: 2%
- Derived from polymer coated sulfur coated urea
- + The nitrogen has been coated to provide 1.10% slow-release nitrogen (N)

Only apply to actively growing turf. Do not apply near water, storm drains, or drainage ditches. Do not apply if heavy rain is expected. Apply this product only to your lawn and sweep any product that lands on the driveway, sidewalk, or street, back onto your lawn.

Information regarding the contents and levels of metals in this product is available on the internet at http://www.regulatory-info-sc.com

**INGREDIENTS:** Mulch (coir pith fiber)
One Step Complete Seeding Mixture
For Bermudagrass Areas

Bermudagrass Blend

NET WT: 5 POUND

<table>
<thead>
<tr>
<th>Pure Seed</th>
<th>Variety</th>
<th>Kind</th>
<th>Germination</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.71% MOHAWK</td>
<td></td>
<td>BERMUDAGRASS (UNHULLED)</td>
<td>80%</td>
<td>AZ/CA</td>
</tr>
<tr>
<td>0.19% SULTAN BRAND FMC-6</td>
<td></td>
<td>BERMUDAGRASS (UNHULLED)</td>
<td>80%</td>
<td>AZ</td>
</tr>
<tr>
<td>0.00% OTHER CROP SEED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>98.10% INERT MATTER*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.00% WEED SEED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(CONSISTS OF 93.00% MULCH, 5.00% FERTILIZER, 0.00% INERT FROM SEED)
NOXIOUS WEED: NONE FOUND PER POUND (LICENSE # F1171)

GUARANTEED ANALYSIS:

Total Nitrogen (N) 0.60%

Derived From: Urea

SOIL AMENDING GUARANTEED ANALYSIS

Active Ingredients:
93.00% Wood Fiber Mulch

Soil Amendment Inert Ingredients:
2.00% Seed
5.00% Fertilizer

IN CALIFORNIA, CONTAINS SOIL AMENDING INGREDIENT
93.00% Wood Fiber Mulch

LOT #: MH18WW9008

TEST DATE: 03-18

Lot, MH19W8800 Test Date: 09/2019
IN WA, AZ, CA, CO, ID, IN, MN, NV, OR, UT, WA & WY SELLS BY 12/31/2019
IN CO, IL, MA, MT, NE & WY SELLS BY 09/10/2019
In all other states, SELLS BY 06/30/2019
Pennington Seed Inc.
P.O. BOX 330 GREENFIELD MO 65661
# Pensacola Bahiagrass

**EXCELLENT SUN & Drought Tolerance**

Better Winter Hardiness and
Mejor resistencia al invierno y mejor calidad de césped

**Produces a Tough, Dense, Low-Maintenance Lawn**
Produce un césped fuerte, denso y de bajo mantenimiento

---

<table>
<thead>
<tr>
<th>Variety / Kind</th>
<th>Pure Seed</th>
<th>Dorm Seed</th>
<th>Total Seed</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pensacola Bahiagrass</td>
<td>98.76%</td>
<td>10%</td>
<td>85%</td>
<td>FL</td>
</tr>
</tbody>
</table>
Seeding

• 0.6 lbs /1,000 or 26 lbs/Acre.
• Lower seeding rate allows for more stolon development.
Hydroseeding
Hydroseeding
Zenith Zoysiagrass

• A seeded zoysiagrass variety available in retail stores.
• Fast establishment.
Turfgrass Establishment - *Plugging*

- Plugging is the planting of 2 - 4” plugs of mature turf into the soil.
- Common with zoysiagrass, St. Augustinegrass, centipedegrass, seashore paspalum, and buffalograss.
  - Planted on 6 - 18” centers.
    - The bigger the plug the farther apart they can be planted.
    - After planting, the site should be rolled.
## Best Spacing!

<table>
<thead>
<tr>
<th>LAWN SIZE</th>
<th>BEST SPACING</th>
<th>NUMBER OF PLUG ORDERS NEEDED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spacing Diagonal 12&quot; Apart # of Plugs</td>
<td>36 @ 3&quot; x 3&quot; Plugs Various Varieties Approximately 64 sq. ft. per 36 plugs</td>
</tr>
<tr>
<td>100 SF</td>
<td>56</td>
<td>2</td>
</tr>
<tr>
<td>500 SF</td>
<td>281</td>
<td>8</td>
</tr>
<tr>
<td>1000 SF</td>
<td>562</td>
<td>16</td>
</tr>
<tr>
<td>2000 SF</td>
<td>1124</td>
<td>32</td>
</tr>
<tr>
<td>3000 SF</td>
<td>1686</td>
<td>46</td>
</tr>
<tr>
<td>4000 SF</td>
<td>2248</td>
<td>62</td>
</tr>
<tr>
<td>5000 SF</td>
<td>2810</td>
<td>78</td>
</tr>
<tr>
<td>10000 SF</td>
<td>5625</td>
<td>156</td>
</tr>
<tr>
<td>20000 SF</td>
<td>11250</td>
<td>312</td>
</tr>
</tbody>
</table>

## Spacing Diagonal 18" Apart

<table>
<thead>
<tr>
<th>LAWN SIZE</th>
<th>Spacing Diagonal 18&quot; Apart # of Plugs</th>
<th># OF ORDERS NEEDED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>36 @ 3&quot; x 3&quot; Plugs Approximately 112 sq. ft. per 36 plugs</td>
</tr>
<tr>
<td>100 SF</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>500 SF</td>
<td>225</td>
<td>6</td>
</tr>
<tr>
<td>1000 SF</td>
<td>450</td>
<td>13</td>
</tr>
<tr>
<td>2000 SF</td>
<td>900</td>
<td>25</td>
</tr>
<tr>
<td>3000 SF</td>
<td>1350</td>
<td>38</td>
</tr>
<tr>
<td>4000 SF</td>
<td>1800</td>
<td>50</td>
</tr>
<tr>
<td>5000 SF</td>
<td>2250</td>
<td>63</td>
</tr>
<tr>
<td>10000 SF</td>
<td>4500</td>
<td>125</td>
</tr>
<tr>
<td>20000 SF</td>
<td>9000</td>
<td>250</td>
</tr>
</tbody>
</table>
Overview

• Selecting the Right Turfgrass
  – The pros and cons of available options

• Establishing/Reestablishing Your Lawn
  – To sod or not to sod?

• Irrigation or irritation
  – PVC pipes are no match for fallen trees!

• Fertilizing Damaged Turf
  – Don’t add insult to injury!
## Comparative Water Use

<table>
<thead>
<tr>
<th>Grass Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahiagrass</td>
<td>Excellent – maintains green color under drought conditions but can wilt and go dormant.</td>
</tr>
<tr>
<td>Bermudagrass</td>
<td>Excellent – turns bluish gray under reduced water. Will eventually turn brown.</td>
</tr>
<tr>
<td>Centipedegrass</td>
<td>Good – persists on less water but can wilt quickly in the absence of water.</td>
</tr>
<tr>
<td>St. Augustinegrass</td>
<td>Good – wilts, but some leaves remain green for longer periods of time.</td>
</tr>
<tr>
<td>Zoysiagrass</td>
<td>Excellent – but can wilt quickly in the absence of water. Within 1-2 weeks, the leaves will be brown and the turf will go dormant.</td>
</tr>
</tbody>
</table>
Evapotranspiration (ET)

• Evaporation (E)
  – Process of water movement, in the form of vapor, into the atmosphere from soil, water, or plant surfaces.

• Transpiration (T)
  – Evaporation of water from plant stomata into the atmosphere.

• Evapotranspiration (ET)
  – Sum of evaporation and transpiration.
Evapotranspiration

Florida Panhandle

JAN  FEB  MAR  APR  MAY  JUN  JUL  AUG  SEP  OCT  NOV  DEC
Rainfall vs. Evapotranspiration - 2016

Florida Panhandle

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

RAIN ET
## Irrigation Needs – Florida Panhandle

<table>
<thead>
<tr>
<th>Month</th>
<th>Daily ET</th>
<th>Weekly ET</th>
<th>67%</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAN</td>
<td>0.05</td>
<td>0.35</td>
<td>0.23</td>
</tr>
<tr>
<td>FEB</td>
<td>0.07</td>
<td>0.49</td>
<td>0.33</td>
</tr>
<tr>
<td>MAR</td>
<td>0.10</td>
<td>0.67</td>
<td>0.45</td>
</tr>
<tr>
<td>APR</td>
<td>0.13</td>
<td>0.91</td>
<td>0.61</td>
</tr>
<tr>
<td>MAY</td>
<td>0.16</td>
<td>1.09</td>
<td>0.73</td>
</tr>
<tr>
<td>JUN</td>
<td>0.18</td>
<td>1.23</td>
<td>0.82</td>
</tr>
<tr>
<td>JUL</td>
<td>0.18</td>
<td>1.23</td>
<td>0.82</td>
</tr>
<tr>
<td>AUG</td>
<td>0.15</td>
<td>1.05</td>
<td>0.70</td>
</tr>
<tr>
<td>SEP</td>
<td>0.13</td>
<td>0.91</td>
<td>0.61</td>
</tr>
<tr>
<td>OCT</td>
<td>0.10</td>
<td>0.70</td>
<td>0.47</td>
</tr>
<tr>
<td>NOV</td>
<td>0.07</td>
<td>0.46</td>
<td>0.30</td>
</tr>
<tr>
<td>DEC</td>
<td>0.05</td>
<td>0.35</td>
<td>0.23</td>
</tr>
</tbody>
</table>
Irrigation Planning
Plant Available Water

- Water held in the soil between field capacity ($\theta_{fc}$) and permanent wilting point ($\theta_{wp}$).
  - “Available” for plant use

- Available Water Capacity (AWC)
  - $AWC = \theta_{fc} - \theta_{wp}$
  - Units: depth of available water per unit depth of soil, “unitless” (in/in, or mm/mm)
  - Measured using field or laboratory methods
Soil Hydraulic Properties and Soil Texture

Table 2.3. Example values of soil water characteristics for various soil textures.*

<table>
<thead>
<tr>
<th>Soil texture</th>
<th>$\theta_{fc}$</th>
<th>$\theta_{wp}$</th>
<th>AWC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse sand</td>
<td>0.10</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Sand</td>
<td>0.15</td>
<td>0.07</td>
<td>0.08</td>
</tr>
<tr>
<td>Loamy sand</td>
<td>0.18</td>
<td>0.07</td>
<td>0.11</td>
</tr>
<tr>
<td>Sandy loam</td>
<td>0.20</td>
<td>0.08</td>
<td>0.12</td>
</tr>
<tr>
<td>Loam</td>
<td>0.25</td>
<td>0.10</td>
<td>0.15</td>
</tr>
<tr>
<td>Silt loam</td>
<td>0.30</td>
<td>0.12</td>
<td>0.18</td>
</tr>
<tr>
<td>Silty clay loam</td>
<td>0.38</td>
<td>0.22</td>
<td>0.16</td>
</tr>
<tr>
<td>Clay loam</td>
<td>0.40</td>
<td>0.25</td>
<td>0.15</td>
</tr>
<tr>
<td>Silty clay</td>
<td>0.40</td>
<td>0.27</td>
<td>0.13</td>
</tr>
<tr>
<td>Clay</td>
<td>0.40</td>
<td>0.28</td>
<td>0.12</td>
</tr>
</tbody>
</table>

* Example values are given. You can expect considerable variation from these values within each soil texture.
Effective Root Zone

• The Effective Root Zone is the depth of soil from which plants can draw nutrients and water.
  – A tree or shrub may have an effective root zone of several feet.
  – A zoysiagrass turf may have only 4” of an effective root zone.
Total Available Water (TAW)

- TAW = total available water capacity within the plant root zone, (inches)

  - TAW = (AWC) (Rd)

- AWC = available water capacity of the soil, (inches of H$_2$O/inch of soil)
- Rd = depth of the plant root zone, (inches)
Total Available Water (TAW)

- Example: Bermudagrass growing on sand.
  - TAW = (AWC) (Rd)
  - TAW = (0.08) (4”)
  - TAW = 0.32” water in the rootzone.

<table>
<thead>
<tr>
<th>Soil texture</th>
<th>$\theta_s$</th>
<th>$\theta_{wp}$</th>
<th>AWC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse sand</td>
<td>0.10</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Sand</td>
<td>0.15</td>
<td>0.07</td>
<td>0.08</td>
</tr>
<tr>
<td>Loamy sand</td>
<td>0.18</td>
<td>0.07</td>
<td>0.11</td>
</tr>
<tr>
<td>Sandy loam</td>
<td>0.20</td>
<td>0.08</td>
<td>0.12</td>
</tr>
<tr>
<td>Loam</td>
<td>0.25</td>
<td>0.10</td>
<td>0.15</td>
</tr>
<tr>
<td>Silt loam</td>
<td>0.30</td>
<td>0.12</td>
<td>0.18</td>
</tr>
<tr>
<td>Silty clay loam</td>
<td>0.38</td>
<td>0.22</td>
<td>0.16</td>
</tr>
<tr>
<td>Clay loam</td>
<td>0.40</td>
<td>0.25</td>
<td>0.15</td>
</tr>
<tr>
<td>Silty clay</td>
<td>0.40</td>
<td>0.27</td>
<td>0.13</td>
</tr>
<tr>
<td>Clay</td>
<td>0.40</td>
<td>0.28</td>
<td>0.12</td>
</tr>
</tbody>
</table>

*Example values are given. You can expect considerable variation from these values within each soil texture.*
Irrigation Uniformity – ABSOLUTELY ESSENTIAL
Catch Can Test
Overview

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  – The pros and cons of available options
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### UF/IFAS Recommendations

#### Table 1. Fertilization Guidelines for Established Turfgrass Lawns

<table>
<thead>
<tr>
<th>Nitrogen Recommendations (lbs 1,000 ft² year⁻¹)¹, ²</th>
<th>North Florida</th>
<th>Central Florida</th>
<th>South Florida</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahiagrass</td>
<td>1.0 – 3.0</td>
<td>1.0 – 3.0</td>
<td>1.0 – 4.0</td>
</tr>
<tr>
<td>Bermudagrass</td>
<td>3.0 – 5.0</td>
<td>4.0 – 6.0</td>
<td>5.0 – 7.0</td>
</tr>
<tr>
<td>Centipedegrass</td>
<td>0.4 – 2.0</td>
<td>0.4 – 3.0</td>
<td>0.4 – 3.0</td>
</tr>
<tr>
<td>St. Augustinegrass</td>
<td>2.0 – 4.0</td>
<td>2.0 – 5.0</td>
<td>4.0 – 6.0</td>
</tr>
<tr>
<td>Zoysiagrass</td>
<td>2.0 – 3.0</td>
<td>2.0 – 4.0</td>
<td>2.5 – 4.5</td>
</tr>
</tbody>
</table>

¹Because homeowner preferences for lawn quality and maintenance level will vary; we recommend a range of fertility rates for each grass and location. Additionally, effects within a localized region (i.e., micro-environmental influences -- such as shade, drought, soil conditions, and irrigation) will necessitate that a range of fertility rates be used.

²These recommendations assume that grass clippings are left on the lawn.
### Growth Potential Modeling

<table>
<thead>
<tr>
<th></th>
<th>Pensacola</th>
<th>Tallahassee</th>
<th>Jacksonville</th>
<th>Gainesville</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAN</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>FEB</td>
<td>0.02</td>
<td>0.02</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td>MAR</td>
<td>0.06</td>
<td>0.06</td>
<td>0.09</td>
<td>0.08</td>
</tr>
<tr>
<td>APR</td>
<td>0.16</td>
<td>0.15</td>
<td>0.19</td>
<td>0.18</td>
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<tr>
<td>MAY</td>
<td>0.40</td>
<td>0.39</td>
<td>0.42</td>
<td>0.39</td>
</tr>
<tr>
<td>JUN</td>
<td>0.62</td>
<td>0.61</td>
<td>0.60</td>
<td>0.57</td>
</tr>
<tr>
<td>JUL</td>
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<tr>
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<td>0.64</td>
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</tr>
<tr>
<td>SEP</td>
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<td>0.56</td>
<td>0.55</td>
<td>0.52</td>
</tr>
<tr>
<td>OCT</td>
<td>0.23</td>
<td>0.22</td>
<td>0.27</td>
<td>0.25</td>
</tr>
<tr>
<td>NOV</td>
<td>0.06</td>
<td>0.05</td>
<td>0.09</td>
<td>0.08</td>
</tr>
<tr>
<td>DEC</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3.5</strong></td>
<td><strong>3.4</strong></td>
<td><strong>3.6</strong></td>
<td><strong>3.4</strong></td>
</tr>
</tbody>
</table>
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