Turf Care and Installation
Cool Season Turf Species

Warm Season Turf Species
Interactive Arizona USDA Plant Zone Hardiness Map
Low Desert (Up to 4,000 feet elevation)
  St. Augustine, bermudagrass, Zoysia,
  seashore paspalum
Overseeding (temporary winter season turf) with a cool season grass - perennial ryegrass, annual ryegrass, turf-type tall fescue, *Poa trivialis*
Arizona Turf Species – Cool Season/High Desert

High Desert and Mountains (Above 4,000 feet)
Bluegrass, turf-type tall fescue,
perennial ryegrass, fine fescue
Warm season varieties vary greatly in color, density, and leaf texture.
Warm season grasses have three reproductive methods:

1. Seed
2. Stolons
3. Rhizomes

- The crown is the growing point
Turfgrass Choices

Each species and variety differs in:

- Maintenance requirements
- Sun requirements
- Shade tolerance
- Temperature tolerance
- Traffic tolerance
- Drought tolerance
Warm Season

**Low Maintenance** (Low Density)

Midiron, Arizona common, St. Augustine

**Medium Maintenance** (Medium Density)

Bull’s-eye (MS Choice), Midiron

**High Maintenance** (High Density)

Tifway, TifGreen, TifGrand, Zoysia, seashore paspalum
<table>
<thead>
<tr>
<th>Seeded Varieties</th>
<th>Vegetative Varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Low wear tolerance</td>
<td>• Good wear tolerance</td>
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<tr>
<td>• Slow recovery</td>
<td>• Quick recovery</td>
</tr>
<tr>
<td>• Poor transition</td>
<td>• Better transition</td>
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<tr>
<td>• Low cost</td>
<td>• High cost</td>
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<tr>
<td>• No sod available</td>
<td>• No pollen allergy reaction</td>
</tr>
<tr>
<td>• <strong>Pollen/allergy reaction</strong></td>
<td>• Sod availability</td>
</tr>
</tbody>
</table>
Varieties

**Seeded**
- Sahara
- Black Jack
- Princess 77*
- La Paloma
- Yuma
- Bermuda Triangle
- Savannah
- Arizona Common
- Riviera

**Vegetative Hybrid**
- Tifway 419
- Tifgreen 328
- Midiron
- Bob-Sod (Bull’s-eye)
- Paspalum*
- TifGrand (new 2011)
Arizona Common Bermuda

- Coarse bladed
- Light green
- Produces viable seed
- **Produces pollen** – common allergen
- Slow recovery from wear
- Many improved varieties available

Photo credit: West Coast Turf
A Seeded Hybrid Bermudagrass with Sod Quality

- Similar to Tifway
- Medium fine leaf texture
- Dark green color
- High leaf density
- Higher overall turf quality than all commercial seeded varieties in US international tests
- Available as seed

Other Seeded Varieties: Blackjack, Contessa, Transcontinental, Pyramid 2, Riviera, Savannah, Sovereign, Southern Star#1, Sundevil II, Veracruz, and Yukon

Go to National Turfgrass Evaluation Program: www.ntep.org as a professional resource for turf trial reports
Bermudagrass Hybrids

- **Vegetative sterile hybrids** — *do not produce seed or pollen. They are established through sodding, stolons, or plugging*

  - Examples:
    - Midiron
    - Bull’s-Eye Bermuda
    - Tifway Bermuda
    - Tifgreen Bermuda
    - TifGrand
Midiron (E-Z Turf) Hybrid Bermuda

- Medium green
- High traffic, low maintenance
- Good recovery from damage
- Hardy
- Sod or stolons
- Infrequent dethatching
- Most widely used commercial landscape sod
Tifway Hybrid Bermuda

- Most popular sports turf
- Medium fine texture
- Dark green
- Very rugged for high traffic
- Reel mower or sharp, high power rotary
- Dense and aggressive growth
- More susceptible to scalping damage
Tifgreen Hybrid Bermuda

- Bright Green
- Low Traffic, Low Maintenance
- High Traffic, High Maintenance
- Drought tolerant
- Good Recovery
- Sod or Stolons
TifGrand Hybrid Bermudagrass

- Newest Hybrid from the University of Georgia
- Medium Fine Texture
- Dark Green
- 60% Shade Tolerance (4-5 hours of sunlight)
- Reel mower recommended
- Use sharp blades, mow often
- 3-4 lbs of nitrogen/year (half regular amount)
Palmetto  Saint Augustinegrass

- Primary use is partial shade
- Light green color
- Wide leaf blade
- Moderate traffic
- Low maintenance
- Sodding recommended
- Do NOT overseed
- Needs 30% sunlight
Seashore Paspalum

- Salt tolerant
- Short winter dormancy
- Usually not overseeded
- Full sun
- Uses 66% less nitrogen per year (2-3# per 1000 sq ft)
Basic Steps To Soil Preparation

• Remove debris, old turf and weeds
• Establish rough grade
• Wet the soil
• Add soil amendments
• Always till in amendments to a depth of 4-6”
• Install sprinklers - full head to head coverage
• Water to settle trenches
• Finished grade
Common Soil Amendments for Turf

Start with a soil test!

• Composted mulch
• Gypsum
• Sulfur
• Starter fertilizer (high in phosphorous)
• Micronutrients
How to Soil Test

https://www.youtube.com/watch?v=XN-9YFlmhG4
Add necessary amendments such as composted mulch, gypsum, sulfur and fertilizer based on soil test.
Thoroughly settle all trenches
Smooth, level, and remove all coarse material (rocks, large dirt clods, old roots, etc.)
<table>
<thead>
<tr>
<th>Planting Method</th>
<th>Planting Season</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sod</td>
<td>Year round</td>
<td>High initial cost</td>
</tr>
<tr>
<td>Seed</td>
<td>Late spring- early summer</td>
<td>Lower initial cost</td>
</tr>
<tr>
<td>Stolons</td>
<td>Summer</td>
<td>Intermediate cost</td>
</tr>
<tr>
<td>Plugs</td>
<td>Late spring- early summer</td>
<td>Low cost 1-2 year grow-in</td>
</tr>
</tbody>
</table>
Planting - Seed

• Spread seed in 2 right angle passes
• Lightly rake & roll entire area
• Apply a maximum 1/4 inch mulch
• Water lightly 3-4 times daily until turf is established
• Allow grass to reach recommended height before mowing – know your species!
Commercial Plantings
• Apply with fiber mulch-hydrostolonize

Residential
• Hand plant as follows
• Dig furrows 2-3” deep, 4-12” apart
• Place stolons and firm the soil
• Lay stolons out by hand, cover with soil
• Roll lightly with water-filled roller
• DO NOT LET STOLONS DRY OUT!
Planting – Sod Installation

• Smooth the grade
• Begin installing along longest straight edge
• Push edges and ends together
• Stagger joints from row to row
• Water all sod every 30 minutes during installation
• Water lightly and roll in 2 directions
• Set timer to run 3-5+ times per day, depending on the weather
• First mow in 10-14 days
Start Early

Smooth Grade

Butt up the edges tightly

Roll !!

Water as you go

Water 3-5+ times per day
Healthy Turf Requires:

- **LIGHT**
- **Air**
- **Water**
- **Nutrients**
All warm season grasses require sunlight...All of them!!!

Most varieties require a minimum of 8 hours of sunlight

Two varieties can tolerate 4-6 hours of sunlight – Palmetto St. Augustine and TifGrand hybrid bermuda
Light is Essential

Do you want your grass to survive or thrive?
Light is Essential
Light is Essential

TifGrand

Palmetto
Best Practices for Light

• Raise the mowing height in shaded areas
• Do not over fertilize with nitrogen in shade areas
• Thin trees on a regular basis
• Do not overwater shaded areas
• Keep leaves and debris removed
• Design your landscapes for the future
Healthy Turf Requires:

- **LIGHT**
- **Air**
- **Water**
- **Nutrients**
Air

• Roots require oxygen for good growth
• Turf quality is directly related to healthy roots
• Compaction (hard surface) is a result of having too little ‘air space’ in the soil
Healthy Soil

- Air: 25%
- Water: 25%
- Soil: 50%

Poorly Drained Soil

- Air: 15%
- Water: 35%
- Soil: 50%
Typical Arizona Soil
Is air really that important?
Before Aeration
Shallow roots
hard, compacted soil
Thick thatch layer

Immediately Following
Nutrients, oxygen and water enter the cores and begin to loosen soil

8 - 12 Weeks Following
Deeper root development, increased lawn density, and reduced thatch layer
Aeration

- Reduces compaction
- Dilutes organic matter
- Increases water percolation
- Increases air exchange
- Improves rooting
Dethatching

• What is thatch?
• Dethatch when the thatch is ½ inch or more
• Why dethatch?
• The best time for dethatching is when it is actively growing
Dethatching

½” thatch layer
Dethatching
Dethatching and Aerification

• Should always be performed when turf is actively growing
• Fertilize 1-2 weeks prior to decrease the amount of time it takes to recover
• Don’t perform either task to close to overseeding
• Dethatch to remove excess organic material
• Aerify to alleviate compacted or poorly drained soils
• The best way to avoid excessive thatch build-up is to mow at the proper height, and the proper frequency, and do not over fertilize your turf
Healthy Turf Requires:

- **LIGHT**
- **AIR**
- **WATER**
- **NUTRIENTS**
Water
Don’t assume anything... when it comes to irrigation!
Best Watering Practices

• **Water deep and infrequently**
  – wet soil 4-6 inches if possible

• **Water early in the morning**
  – Coolest time of the day, least amount of evaporation

• **Adjust timers weekly**
  – water should be based on the weekly ET- evapotranspiration rate

• **AZMET**
  – Arizona Meteorological Network
    - Phoenix Area Turf Water Management

[https://cals.arizona.edu/azmet/phxturf.html](https://cals.arizona.edu/azmet/phxturf.html)
Healthy Turf Requires:

- **LIGHT**
- **Air**
- **Water**
- **Nutrients**
Nutrition

• Get soil test – below thatch
• Macro-nutrients – nitrogen, phosphorous, potassium, calcium, magnesium and sulfur
• Micronutrients
• The pH block to nutrients
Healthy turf has a massive ‘filter system’ of roots that is very efficient in absorbing water and nutrients. Fertility programs that focus only on nitrogen only feed the top growth. **Your turf needs the other nutrients** to feed and develop the root system. Don’t fertilize with just nitrogen all the time.
High pH makes every nutrient less available in Arizona soils.
# Macronutrients

<table>
<thead>
<tr>
<th>Macronutrient</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phosphorus (P)</strong></td>
<td>Component of nucleic acids, membranes, adenosine triphosphate, and several coenzymes. Affects rate of seedling development, maturation, and root growth.</td>
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<tr>
<td><strong>Potassium (K)</strong></td>
<td>Activates enzymes used in protein, sugar, and starch synthesis. Important in maintaining turgor pressure in plants. Affects drought tolerance, cold hardiness, and disease resistance.</td>
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<tr>
<td><strong>Calcium (Ca)</strong></td>
<td>Occurs in middle lamella of cell wall where it helps to “cement” walls together. Important in cell division and membrane function. Calcium deficiencies result in poor root and shoot growth.</td>
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<tr>
<td><strong>Magnesium (Mg)</strong></td>
<td>Important component of chlorophyll, activates many enzymes. Magnesium deficiencies result in foliar chlorosis (yellowing).</td>
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<tr>
<td><strong>Sulfur (S)</strong></td>
<td>Present in certain amino acids, proteins, membranes, and coenzymes. Sulfur deficiencies result in chlorosis.</td>
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</table>
**Micronutrients**

**Iron** (Fe)  Important in chlorophyll formation, photosynthesis, and nitrogen metabolism. Iron deficiencies result in chlorosis of young leaves.

**Manganese** (Mn)  Present in chloroplast membranes and functions as enzyme activator. May be involved in resistance to some diseases.

**Zinc** (Zn)  Involved in chlorophyll synthesis and amino acid synthesis, involved in synthesis of the growth hormone indoleacetic acid.

**Boron** (B)  Plays a role in DNA synthesis and translocation of sugars.

**Copper** (Cu)  Essential for photosynthesis and a component of certain enzymes.

**Molybdenum** (Mo)  Component of enzyme that reduces nitrate in plants.

**Chlorine** (Cl)  Plays a role in photosynthesis.
Year Round Desert Turfgrass

- Summer Bermudagrass
- Transition
- Winter Turf
- Overseed
## Year Round Desert Turfgrass

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</tbody>
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Overseeding

- Ideal timing for overseeding
  - Night temperatures 55°F
  - Daytime temperatures 80-85°F
- Ideal timing – early October
  - Window – September 1 to November 1
    - Late summer competition with bermudagrass
    - Late fall contend with frost (November 15)
Winter Lawn Varieties

Ryegrass Annual vs. Perennial

- **Annual**
  - Less expensive per pound
  - Requires more seed

- **Perennial**
  - Darker green
  - Easier to mow
  - Hardier
  - Finer blade
  - Uses less water
• Goals for successful overseeding
  – Acceptable establishment
  – Good density
  – Uniform surface
  – Good performance
  – Mow evenly in the spring
  – Uniformly transition in spring
Overseeding Preparation

• Fertilize
  – Stop N fertilization 20-30 days before overseeding

• Mow
  – DO NOT scalp or ‘summer’ verticut directly before overseeding
  – Raise mowing height 30-40% (relative to original height) 2 weeks before overseeding
  – Cut to original height
  – Lower mowing height 25 -30% for last mowing before overseeding
    • Last mowing clippings can be mulch for overseeded seed
    • Shallow repeated verticut on Tifway and other dense varieties
Overseeding Preparation

- **Water**
  - Reduce by 30% at 1-2 weeks before overseeding
  - Stop watering 2-3 days before overseeding
Overseed Establishment

• Germination watering schedule
• Adjust watering schedule once established
• First mowing height depends on species
Spring Transition/Green Up

• Temperatures in April
  – Green-up
  – Growth
  – ≥60°F (nighttime lows) for 5 consecutive nights

• Temperatures in May
  – 70°F
  – Encourage bermudagrass growth
Spring Green Up Transition for Overseeded Lawns

• Temperature is 60°F or higher for 5 nights in a row
• Gradually lower the mowing height to ¾ of an inch or less
• Keep the mower at this lowered setting until the transition is completed
• Continue normal watering
• **Do Not Shut off the Water**
• Fertilize
• Encouraging bermudagrass growth
  — Fertilizer
    • Increase fertility with light and frequent N applications
      — 0.25 lb/1000 ft$^2$ every 7-14 days
  — Cultivation
    • Light verticutting to stress ryegrass
    • Aerification
    • Brushing
Spring Transition

• Chemicals
  – Sulfonylurea herbicides
    Tools only as transition-aide products
    • Revolver*
    • Monument*
    • TranXit*
    • Manor*
    • Corsair*
    • Certainty*
    • Sapphire*
  – Kerb*

*See additional information found on the resources page and on our website [https://www.azlca.com/study-materials](https://www.azlca.com/study-materials)
Spring Transition

• Chemicals
  – Tools only as transition-aide products

• Complementary cultural practices
  • Lower mowing heights to reduce canopy over bermudagrass
  • Lightly verticut to remove ryegrass
    – 80% bermudagrass
  • 0.25 to 0.5 lb N
  • Decrease watering 20% for 1 week
    – Repeat fertilizer application and water cycle to stress ryegrass
Spring Transition

• Mow close, mow often, water and fertilize lightly
Spring Green Up Transition for Non-Overseeded Lawns

• Bermudagrass growth resumes when night temperatures reach 60°F and above, usually between March and May
• Begin fertilizing with a balanced fertilizer
• Increase watering to every 3-5 days to a depth of 8-10 inches
• Begin mowing when the grass is 1/3 higher than the desired height
1. Mowing
   A. Mower types
   B. Optimal mowing heights
   C. Best practices

2. Weed control & pests
   A. Weeds
   B. Pests
   C. Diseases
Mowers

Reel

Rotary

Keep your blades sharp!!
Mulching Mowers

- Allows clippings to be left on the turf if it is mowed at the proper frequency and height
- Clippings decompose quickly and return nutrients to the soil
- Can reduce fertilizing by 25%
- Do not use a mulching mower on wet grass, unless you like green peanut butter
Removing Clippings

• Remove clippings if excessive (more than 1/3 of the grass blade)

• Remove clippings if the lawn is diseased, or weeds are setting seeds.
Mowing

- **Do Not Remove more than 1/3 of the grass blade**
- Keep mower blades sharp
- Mowing height is determined by turfgrass species and environmental conditions
- Do not mow lower than the lowest height recommended
  - It might expose or damage the crowns
<table>
<thead>
<tr>
<th>Turfgrass</th>
<th>High Maintenance (low cut)</th>
<th>Intermediate Maintenance</th>
<th>Low Maintenance (high cut)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Base</td>
<td>Mow At</td>
<td>Base</td>
</tr>
<tr>
<td>Tifgreen Bermuda 328</td>
<td>1/4</td>
<td>3/8</td>
<td>---</td>
</tr>
<tr>
<td>Tifway Bermuda 419</td>
<td>1/2</td>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>Santa Ana Bermuda</td>
<td>3/4</td>
<td>1</td>
<td>1 1/2</td>
</tr>
<tr>
<td>Midiron Bermuda (EZ Turf)</td>
<td>3/4</td>
<td>1 3/8</td>
<td>1 1/2</td>
</tr>
<tr>
<td>Common and other seeded lawn type bermudas</td>
<td>1</td>
<td>1 3/8</td>
<td>1 1/2</td>
</tr>
<tr>
<td>Zoysia Japonica</td>
<td>1</td>
<td>1 3/8</td>
<td>1 1/2</td>
</tr>
<tr>
<td>Buffalograss</td>
<td>1 1/2</td>
<td>2</td>
<td>2 1/2</td>
</tr>
<tr>
<td>Perennial ryegrass</td>
<td>1/4</td>
<td>3/4</td>
<td>1 1/4</td>
</tr>
<tr>
<td>Annual ryegrass</td>
<td>1 1/2</td>
<td>1 7/8</td>
<td>1 3/4</td>
</tr>
<tr>
<td>St. Augustine</td>
<td>1</td>
<td>1 3/8</td>
<td>1 3/4</td>
</tr>
</tbody>
</table>
Nutsedge
Nutsedge

- *Cyperaceae sp.* – purple and yellow nutsedge
- Underground ‘nutlets’ form along chains or at chain ends
Pearl Scale
White Grub Damage
White Grub Damage
Diseases

• Some problems can be easily controlled, others require more effort...
Acknowledgements

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