**Turf Care and Installation**

**Cool Season Turf Species**

**Warm Season Turf Species**

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**Interactive Arizona USDA Plant Zone Hardiness Map**


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**Arizona Turf Species – Warm Season/Low Desert**

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*

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**Arizona Turf Species – Cool Season/High Desert**

High Desert and Mountains (Above 4,000 feet)

- Bluegrass
- turf-type tall fescue
- perennial ryegrass
- fine fescue

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**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

Seeded vs. Vegetative

**Seeded Varieties**
- Low wear tolerance
- Slow recovery
- Poor transition
- Low cost
- No sod available
- Pollen/allergy reaction

**Vegetative Varieties**
- Good wear tolerance
- Quick recovery
- Better transition
- High cost
- No pollen allergy reaction
- Sod availability

Varieties

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

**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

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 Z, Riviera, Savannah, Sovereign, Southern Star#1, Sundevil II, Veracruz, and Yukon

Go to National Turfgrass Evaluation Program: [www.ntep.org](http://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-9YlmHG4
Till the soil 4-6” deep

*Residential or Commercial*

Add necessary amendments such as composted mulch, gypsum, sulfur and fertilizer based on soil test

Thoroughly settle all trenches

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**Planting Methods**

<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>

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**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!

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**Planting- Stolons**

**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

**Turf Care**

**Healthy Turf Requires:**

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

**Sunlight**

- 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**

**Best Practices for Light**

- Raise the mowing height in shaded areas
- Do not overfertilize 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

**Typical Arizona Soil**

- Air: 11%
- Water: 27%
- Soil: 62%

**Healthy Soil**

- Air: 25%
- Water: 35%
- Soil: 40%

**Poorly Drained Soil**

- Air: 15%
- Water: 50%
- Soil: 35%
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 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 too 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**
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

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.

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**Macronutrients**

- **Phosphorus (P)**: Component of nucleic acids, membranes, adenosine triphosphate, and several coenzymes. Affects rate of seedling development, maturation, and root growth.
- **Potassium (K)**: Activates enzymes used in protein, sugar, and starch synthesis. Important in maintaining turgor pressure in plants. Affects drought tolerance, cold hardiness, and disease resistance.
- **Calcium (Ca)**: 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.
- **Magnesium (Mg)**: Important component of chlorophyll, activates many enzymes. Magnesium deficiencies result in foliar chlorosis (yellowing).
- **Sulfur (S)**: Present in certain amino acids, proteins, membranes, and coenzymes. Sulfur deficiencies result in chlorosis.

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**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.

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**High pH makes every nutrient less available in Arizona soils**

- Nitrogen
- Phosphorus
- Potassium
- Calcium
- Magnesium
- Sulfur
- Iron
- Manganese
- Zinc
- Boron
- Copper
- Molybdenum
- Chlorine
**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

**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

**Spring Transition**

- Encouraging bermudagrass growth
  - Fertilizer
    - Increase fertility with light and frequent N applications
      - 0.25 lb/1000 ft² 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
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 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

Spring Transition

- Mow close, mow often, water and fertilize lightly

Turf Maintenance

1. Mowing
   A. Mower types
   B. Optimal mowing heights
   C. Best practices

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

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

Mowers

- Reel
  - Keep your blades sharp!!
- Rotary

Rotary
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

Mowing Height

<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>S. Augustine</td>
<td>1</td>
<td>1 3/8</td>
<td>1 3/4</td>
</tr>
</tbody>
</table>
- *Cyperaceae* sp. – purple and yellow nutsedge
- Underground ‘nutlets’ form along chains or at chain ends
Diseases

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

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