Bermudagrass: Management for Golf Courses

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Why Turfgrass?

Benefits
* Permanent Vegetative Cover
  ✓ Filter
  ✓ Protect water quality
    ➥ Bare soil – a 2-inch rain event can generate 5 tons of soil loss / acre
  ✓ Slows down runoff
  ✓ Traps dust & smoke

Adaptation

Warm-season Grass Species
* Active Growth – Summer
  ✓ Air temperatures – 80° to 95° F
  ✓ Night Temperatures – high 60s to low 70s
  ✓ Root activity – 65° F

* Dormancy
  ✓ Soil Temperatures – 50° to 55° F

* Tropical & Subtropical Regions
Bermudagrass Cultivars
Vegetative - UGA

* Tifway ‘419’
- Released in 1960
- Most used hybrid
- Certified Sod

* TifTuf
- Drought hardy
- Wear tolerance

* TifGrand, TifSport, TifEagle, Tifdwarf

New Technologies

Bermudagrass Genotypes Under Short-Term Drought

Drought

2011 Univ. of Florida Drought Trial – Jay, FL
### Bermudagrass Cultivars

#### TifGrand
- Dark green color
- Lower nitrogen rates
- Shade persistence
  - 6 hours – intermittent sun
- Range of mowing heights
  - ¼ to 1½ inches
- Seedheads – not viable

#### Bermudagrass Cultivars

#### Vegetative
- Oklahoma State University
  - Patriot & Latitude 36
- Celebration – shade (6 hours)
- Certified grass – blue tag
  - Encourage the consumer
- Putting green cultivars
  - Tifdwarf, TifEagle, Mini Verde, Champion, Sunday

#### Bermudagrass Cultivars

#### Seeded
- Princess 77, Riviera, Monaco, Arden 15,
  - NuMex-Sahara, Sunstar, Transcontinental, etc.
- Availability
- Seeding rate – 1 lb of hulled / 1000 ft²
- Cost (premium)
  - ≈ $30 / lb for 1000 ft²
  - ≈ $140.50 / 500 ft² pallet – $281 / 1000 ft²
Bermudagrass Cultivar Water Usage

Baldwin et al., 2006
Bermudagrass Cultivar Water Usage

Common Trends
1) Regardless of irrigation regime, there are differences between cultivars.
2) Quality declines as duration between irrigation events increases.
3) The cumulative effect on reduced quality is greater as the irrigation interval increases.
Bermudagrass Cultivar Water Usage

What is the turfgrass manager to do?

* Find a balance between quality & optimizing rooting depth.
  - Water between days 4 and 6
  - Soil volume – water, nutrients, stress recovery, etc.

* Water deep and infrequent.

* Avoid daily, or semi-daily, irrigation.
  - Odd / even

Putting Greens

Question

Why focus on putting green management?
Are your greens HD ready?

Warm-season Putting Greens
Considerations
* Playability
* PGRs
* Topdressing
* Rollers
* Covers
* Colorants

Warm-season Putting Greens
Characteristics
* Optimal Sunlight – 100% full
* Optimal Soil temp. shoot growth – 80° to 95° F
  ✓ Shoot dormancy temp – ~50°F
* Optimal Soil temp. root growth – 75° to 95° F
  ✓ 50% root loss – unknown
  ✓ Growth limiting temp. – 100° to 110° F
  ✓ Lethal soil temp. – 120°F
Warm-season Putting Greens

Characteristics
- Soil – sand to loam
- Avg. Summer ET (inches / day) – 0.15 to 0.28
  - Irrigation needs – deep
- Air circulation / drainage – minimal
- Cultivation timing
  - May to September

Wet Greens

Warm-season - Greens
- Improve internal drainage
  - Drain tile
- Core aerification / deep time
- Vent, spike, slice
- Increase air drainage
- Remove (squeegee) free-standing water

Bermudagrass Putting Greens

Characteristics – Fertility
- Annual N – 4.0 to 6.0 lbs / 1000 ft²
  - Optimal timing – April to September
  - Damage – November to March
- Soil phosphorus (P) – low to high
- Soil potassium (K) – medium to high
- pH – 5.5 to 7.0
Bermudagrass
Characteristics - Tolerances
* Salt – high (1,000 to 2,000 ppm)
* Pesticides – very good
* Disease susceptibility – low
* Consider overseeding or painting for winter color

Grass Choices
Bermudagrass
* Older cultivars
  ✓ Tifgreen / ‘328’
  ✓ Tifdwarf
  ✓ Sunday
* Ultradwarfs
  ✓ TifEagle
  ✓ Champion
  ✓ Mini Verde

Grass Choices
Bermudagrass
* Tifgreen / ‘328’
  ✓ Released in 1956
  ✓ Hybrid – *C. dactylon* x *C. transvaalensis*
  ✓ Mowing height – 0.189 to 0.252 inch
  ✓ Collars, approaches, & tees
  ✓ Pests – sting nematode & Spring Dead Spot
Grass Choices
Bermudagrass
* Tifdwarf
✓ Released in 1965
✓ Mutant of Tifgreen
✓ Shorter leaves & internodes than Tifgreen
✓ Mowing height – 0.157 to 0.189 inch
✓ Putting Greens
✓ Pests – caterpillar, mole cricket, sting nematode
✓ Problems – off-types

Grass Choices
Bermudagrass – Ultradwarfs
* High-density
* Putting greens
* Selected for low mowing capability
✓ 0.080- to 0.125-inch
* High maintenance requirements
✓ PGRs
✓ Topdressing, thatch management, covers, etc.

Grass Choices
Bermudagrass – Ultradwarf
* TifEagle
✓ Released in 1997 - UGA
✓ Cobalt radiation of Tifway II
✓ Fine leaf texture & high density
✓ Mowing height – 0.118 inch
✓ Putting Greens
✓ Pests – mole cricket, sting nematode
✓ Problems – thatch
Grass Choices
Bermudagrass – Ultradwarf

* Champion
  ✓ Released in 1995
  ✓ Selection from Tifdwarf
  ✓ Fine leaf texture & high density
  ✓ Mowing height – 0.118 inch or less
  ✓ Putting Greens
  ✓ Pests – mole cricket, sting nematode
  ✓ Problems – thatch

Grass Choices
Bermudagrass – Ultradwarf

* MiniVerde
  ✓ Released in late 1990’s
  ✓ Selection from Tifdwarf
  ✓ Fine leaf texture & high density
  ✓ Mowing height – 0.118 inch or less
  ✓ Putting Greens
  ✓ Pests – mole cricket, sting nematode
  ✓ Problems – thatch

Tournament Ready Greens
Playability and Expectations

* Fast
* Firm
* Smooth
* True
* Green
* Have grass
Putting Green Speed

Measurement
* Stimpmeter
  ✓ Released in 1960
* Flat area
  ✓ Survey greens
* Path of ball travel
  ✓ Same path

Putting Green Speed

Measurement
* Stimpmeter
  ✓ Released in 1960
* Flat area
  ✓ Survey greens
  ✓ Keep marked
* Path of ball travel
  ✓ Same path

Need for Speed

Speed Kills
* Is this the objective?
* What can your customer handle?
* Who’s calling the shots?
* Loss of cupping locations
* Where does it end?
Need for Speed

The average golfer seems unable to detect a 6-inch variation in green speed … Therefore, a 6-inch variation among greens is probably a fair definition of consistency on a golf course.

Karcher et al., GCM 2001

Need for Speed

Speed Kills

- Mowing Height
  - Know your grass
  - Daily vs. Event

- Management
  - Fertility
  - Topdressing
  - Rolling

Putting Green Speed

![Graph showing the relationship between putting green speed and effective height of cut by prism (mm)](image)

Woods, 2018
Putting Green Speed

What does a SD of 0.3 feet look like?

Firmness

TruFirm – USGA & Spectrum

* Simple & easy to use
* Highly portable & lightweight
* Nondestructive to greens
* Data
  ✓ Logged
  ✓ Easy to read & understand
  Measurements – inches of penetration
* Can be applied to all areas of the golf course
Firmness

TruFirm – Data

* Collection
  - Morning & afternoon
  - All greens
  - Spatial variability – 9 to 12 samples within a green
    - Measurements – inches of penetration

* Consistency
  - <5% variability among 18 greens

* Water management

USGA TruFirm

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<thead>
<tr>
<th>Sampling Days</th>
<th>Penetration (inch)</th>
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<tbody>
<tr>
<td></td>
<td>Prior to Tournament Week</td>
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C. Waltz - UGA - AGCSA
Firmness

TruFirm
- Manage softness
  - Irrigation & rain
  - Mowing & rolling have little impact
- Firmness
  - Weather – temperatures, humidity, sunlight, etc.
  - Subair
- Speed and firmness are fairly independent

Plant Growth Regulators

Enhancements / Improvements
- Color
  - Darker green color – chlorophyll content
  - Persist – 3 to 4 weeks
- Canopy density
  - Tightening / thickening
  - Typically after the 2nd application
- Uniformity
- Reduce clippings

Plant Growth Regulators

Type II PGRs
- Primo (trinexapac-ethyl)
- Cutless (flurprimidol)
- Trimmit (paclobutrazol)
- Legacy (flurprimidol + trinexapac-ethyl)
- Anuew (prohexadione)
Plant Growth Regulators

Ball Roll Distance

* Bentgrass
* PGRs evaluated – 4
* Mowing & Rolling treatments

* Conclusions
  ✓ Type II PGRs increased ball roll distance
  ✓ PGRs + mowing increased ball roll distance
Plant Growth Regulators

Ultradwarf Shade Enhancement

* TifEagle bermudagrass
* PGRs evaluated – Primo Maxx (3 week apps.)
* Light hours – 12, 8, & 4 hours

* Conclusions
  ✓ Bermudagrass performance declined with shade
  ✓ PGRs + increasing mowing height improved bermudagrass quality

Topdressing

Reasons

* Thatch management
* Surface leveling
* Soil amendment
* Improve drainage
* Protect the crown
* Assist in overseeding

Kentucky Bluegrass

Thatch
Sod layer
Rootzone
Topdressing

Procedures
* Light & frequent
  ✓ ⅛ to ½ inch
* Sand
  ✓ Medium to coarse texture
  ✓ Match existing soil
* Reaching soil surface
  ✓ Mow turf low
  ✓ Broom or rub-in

Topdressing

Procedures
* Sand
  ✓ 35 Sand
  ✓ 45 Sand
  ✓ 55 Sand (ultradwarf)
  ✓ 65 Sand (ultradwarf)
* Aeration vs. Maintenance
  ✓ A = Similar to rootzone mix
  ✓ M = finer texture

Topdressing

Incorporation
* Use dry sand
* Begin with dry putting surface
* Allow topdressing to dry before incorporation
* Groom or light vericutting prior to topdressing
* Increase frequency at lower rates
Topdressing

Topdressing volumes can be tricky to visualize

<table>
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<th>(1/160 inch)</th>
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<th>(1/20 inch)</th>
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<tbody>
<tr>
<td>50 lbs / 1000 ft²</td>
<td>200 lbs / 1000 ft²</td>
<td>400 lbs / 1000 ft²</td>
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<tr>
<td>0.5 ft³ / 1000 ft²</td>
<td>2.0 ft³ / 1000 ft²</td>
<td>4.0 ft³ / 1000 ft²</td>
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Topdressing builds the soil of the future:

Do it right the first time!

Thank You

Visit
www.GeorgiaTurf.com