Managing Turfgrass in Stadium Shade

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BBVA Compass Stadium
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My Background:

- BBVA Compass Stadium
  - Heavy Shade from the roof structure

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My Background:

- BBVA Compass Stadium
  - Heavy Shade from the roof structure
    Opened in 2011
    Grass replaced 7 times in first 5 years
    Currently on a 3 year run with our grass.

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My Background:

- Minute Maid Park
  - Retractable roof stadium

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My Background:

- Minute Maid Park
  - Retractable roof stadium
  - Opened in 2000
  - Originally Bermudagrass
  - Typically sodded 1-2 times per calendar year first few years.
  - Converted to Sea Isle I Paspalum in 2001-02
  - 2009 Converted to Platinum TE Paspalum
  - 2009-2015 – no significant sodding due to the success of the Platinum TE.

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Minute Maid Park, Houston

Platinum TE seashore paspalum

-Only **1 lb. N/ 1000 sq. ft.** over the growing season used

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Today's Discussion Points:

Turf Maintenance 101 review
Shade management differences
- Fertilizer
- Spraying – liquid ferts
- Mowing
- Watering

Managing Traffic
Can't shoot self in foot – no margin for mistakes
DLI
Different Species/Cultivars
Communication
Benefits of Shade

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Photosynthesis

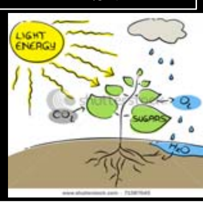
= the process plants use to convert light energy into chemical energy

sunlight

$$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$$

(Carbon dioxide + water → glucose + oxygen)

CO_2 – from atmosphere
H_2O – from soil



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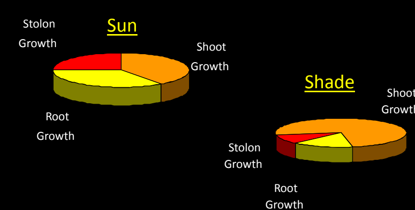
Growth/Energy Allocation in Shade



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Turf Species- Shade Tolerance

High

Fine fescue / Supina bluegrass
Colonial bentgrass / Rough bluegrass
Tall fescue
Creeping bentgrass
Kentucky bluegrass
Perennial ryegrass

St. Augustine
Zoysiagrass
Seashore pasp.
Centipedegrass
Bahiagrass
Bermudagrass

Low

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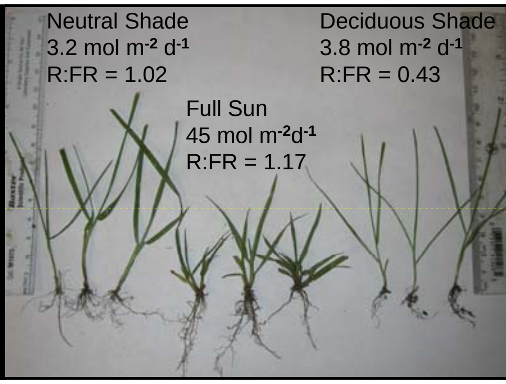

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Prioritizing Cultural Management for Shaded Turf

1. Use adapted species & cultivars
2. Remove trees or limbs (at least 8 ft off ground)
3. Irrigate only as needed
4. Avoid excess nitrogen (50% of FS)
5. Increase mowing heights
6. Monitor and preventatively treat disease
7. Minimize/ control traffic
8. Root pruning
9. Plant growth regulators * (GA inhibitors)
10. Fans, lights (high end golf courses)

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Turfgrass Maintenance 101 Review

- Mowing – correct height, sharp blade, 1/3 rule
- Fertilizing – soil test, pH, NPK, 6-12+ lbs N, micros
- Irrigation – deeply and infrequently, 5-9AM
- Aerating – a few times per year.

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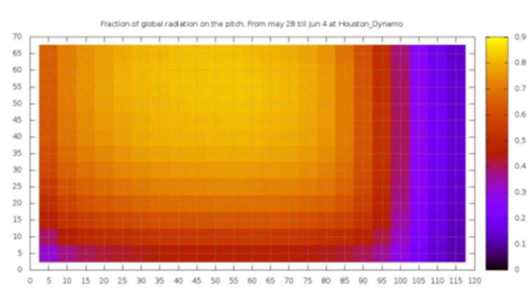

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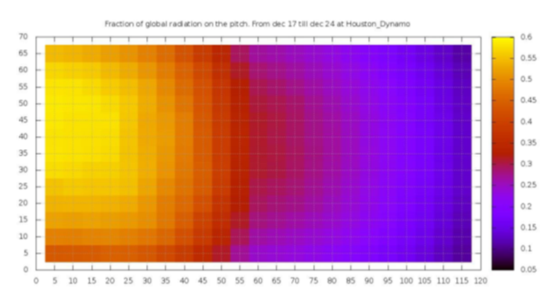

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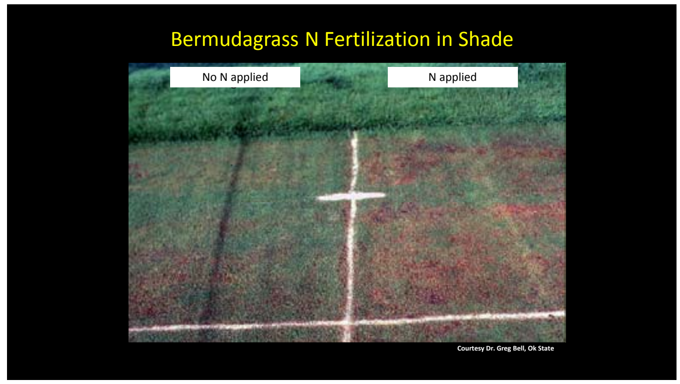

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Mowing

- Height
- 1/3 rule
- Drop-down cuts
- Time of day to mow
- Machine choice
- Sharp reels/blade
- Operator proficiency

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Fertility differences in the shade:

- Soil test
- Tissue test
- Less N
- Steady diet Ca, Mg
- Amino acid products weekly +

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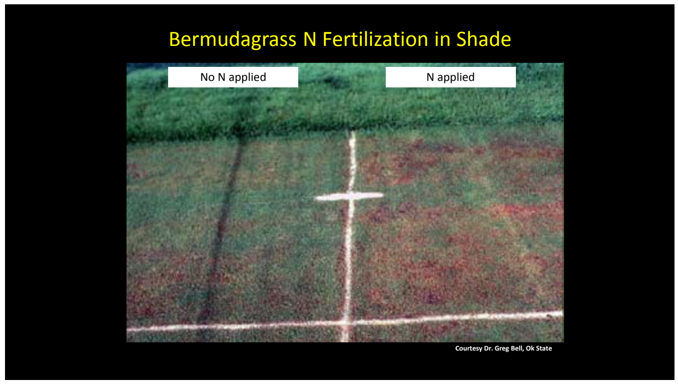

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Aeration in the Shade

- Tine choice
- Machine choice
- Season choice
- Holes/foot
- Core clean up

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Irrigation tips

- Custom irrigation by zone/shade
- Syringe grass as shade line leaves
- Water off dew in long-term shade
- PM watering to allow leaves to dry before evening

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Traffic Management

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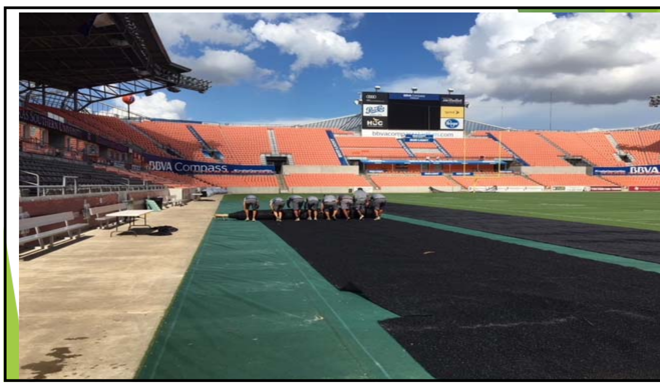

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Communication

- Grounds Crew
- Front Office
- Teams/Coaches
- Guests
- Media

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Media Communication

- TV load-in
- Still camera locations
- Field access time and location
- Front-end communication about field conditions
- Through media relations department or proper channels.
- If speaking to media on camera, have 3 bullet points to focus on.

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Communication with Stadium Guests

- Hopefully on the front end before arrival.
- Communicate with roped-off areas.
- Guests aren't familiar with our sensitive field areas.
- Communicate through Security and Guest Services channels.

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Front Office Communication

- Communicate current and expected field conditions
- Weather conditions
- Game/Event schedules
- Client events – time of year, locations, duration
- Roped off areas communicated in advance
- Team bench area (carts) traffic plan
- Security pre/post game

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Communication with Teams/Coaches:

- Communicate field conditions, current and expected
- Warmups
- Warmups location
- Post-game work

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Grounds Crew Communication

- Communicate the shade issue
- Communicate the plan to manage the shade issue
- Train operators properly on equipment use in the shade
- Clutch, tire spins, avoid the areas, don't block the sun, avoid tight turns, nothing repetitive

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Grow Lights

- Topic is a talk in itself
- Clearly work and help
- Costly
- Other options?

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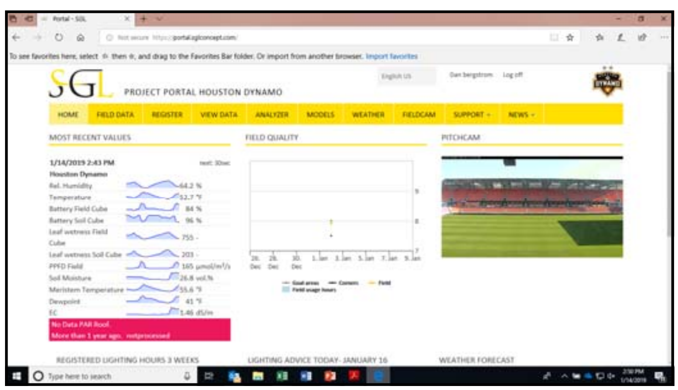

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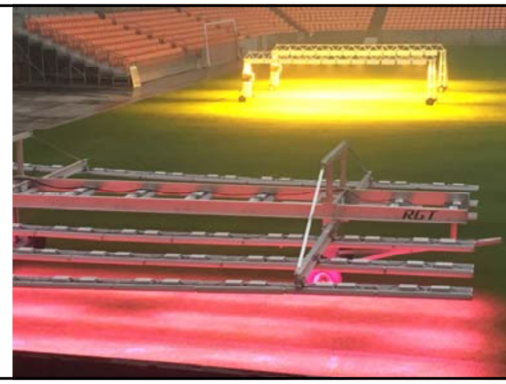

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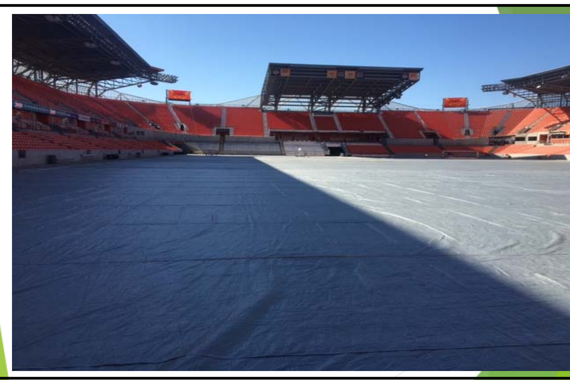

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Grow Blanket topics:

1. Remember you are cutting sunlight by up to 25%.
   1. We don't deploy on cloudy days.
2. Need sunlight to produce the heat underneath.
3. Overuse of the blankets = weaker turf later in spring.
4. Overseeded vs non-overseeded deployment is different in Houston.

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Daily Light Integral (DLI)

- Cumulative amount of PAR received over 24 hr period as a function of light intensity (instantaneous light: μ mol m^2 s^{-1}) and duration (day)
- Concept similar to a rain gauge for photons
- Unit: mols m^2 d^{-1}
- Most biologically relevant measurement



USGA

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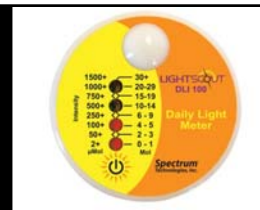

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GENERALIZED PLANT RESPONSES TO DIFFERENT LIGHT LEVELS

Relative Light Level	DLI* - Daily Light Integral	Light Intensity** at Noon	Generalized Plant Growth Response
Very Low	2 to 5	100 to 200	Poor quality
Low	5 to 10	200 to 400	Minimum acceptable
Medium	10 to 20	400 to 800	Good quality
High	20 to 30	800 to 1,200	Excellent quality
Very High	30 to 60	1,200 to 2,000	Excellent quality

Note: It is not possible to make a direct conversion between an instantaneous light measurement and the Daily Light Integral. Also, temperature is a key factor in plant quality and growth.

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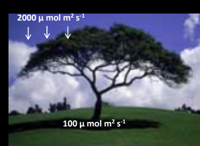
Reduced Light Intensity

- Measured as 'Photosynthetic Photon Flux' (PPF) which is number of photons falling per second on a given area
- Measured with a quantum meter in units of µmol m^2 s^{-1}
  - Full sun June day = 2000 µmol m^2 s^{-1}
  - Under oak tree = 100 µmol m^2 s^{-1}
  - Full sun December = 1200 µmol m^2 s^{-1}
- Quantum Sensor can be purchased for ~$200-$400



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Cultivar	Trinexapac-Ethyl	Daily Light Integral Requirement (mol/ m^2/ d) Spring	Summer	Fall
		Fairway Height		
Tifway	-	20	26	25
	+		26	17
Tifgrand	-	16	25	20
	+		25	20
Celebration	-	17	24	19
	+		24	19
Latitude 36	-	16	24	19
	+		24	18
		Rough Height		
Tifway	-	25	32	25
Tifgrand	-	19	34	17
Celebration	-	19	25	17
Latitude 36	-	20	23	17

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Cultivar	Trinexapac-Ethyl	Daily Light Integral Requirement (mol/ m^2/ d) Spring	Summer	Fall
		Fairway Height		
Zeon	-	11	19	15
	+		15	14
Zorro	-	10	18	13
	+		15	12
Geo	-	13	23	13
	+		20	12
Palisades	-	13	23	17
	+		18	14
JaMur	-	12	26	17
	+		17	14
		Rough Height		
Zeon	-	11	10	9
Zorro	-	9	9	9
Palisades	-	9	13	11
JaMur	-	11	14	12
Palmetto S.A.	-	11	14	11

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Plant Growth Regulators

- Gibberelic acid (GA) production is a natural response to shading which causes the spindly & etiolated growth habit
- GA inhibitors have shown promising benefits in shade
  - Trinexapac-ethyl (foliar absorbed)
  - Flurprimidol (root absorbed)
  - Paclobutrazol (root absorbed) 'Scotts Shaded Lawn Fertilizer'
- Increased chlorophyll, reduce shoot elongation, increased tillering, increased carbohydrate levels in many species
- Increased wear resistance, but will delay growth/recovery rates following trafficking

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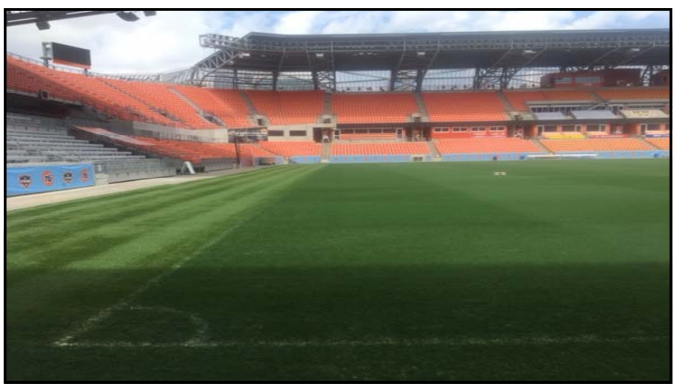

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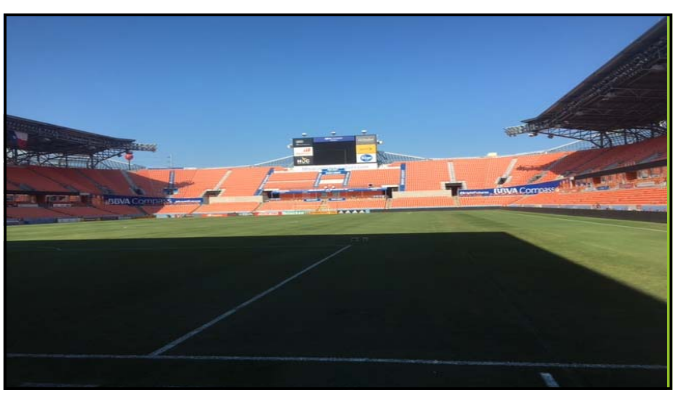

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