

Sustainable Turf & Landscapes

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Home Lawns

- ◆ A dense, healthy lawn prevents run-off, absorbing rainfall six times more effectively than a wheat field and four times better than a hay field.
- ◆ Turfgrass helps control pollution, trapping much of an estimated 12 million tons (10.9 million metric tons) of dust and dirt released annually into the US atmosphere.
- ◆ The front lawns of eight average houses have the cooling effect of about 70 tons (68 metric tons) of air conditioning, while the average home-size central air has only a 3 to 4 ton capacity (2.7 to 3.9 metric tons).

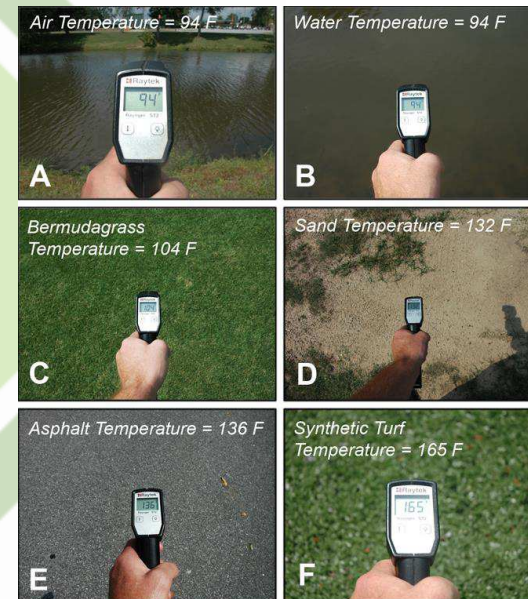


Sports Turf

Natural vs. Artificial

- ◆ Safety Debate
- ◆ Cost
 - ◆ additional infill
 - ◆ irrigation because of unacceptably high temperatures on warm-sunny days
 - ◆ chemical disinfectants
 - ◆ sprays to reduce static cling and odors
 - ◆ drainage repair and maintenance
 - ◆ erasing and repainting temporary lines
 - ◆ removing organic matter accumulation.
- ◆ MSU \$13,720-\$39,220, typical annual maintenance costs of natural turf fields had a similar range of \$8,133-\$48,960

Temperature



Photos courtesy L.B. McCarty, Clemson University

Great Turf Made Simple

- ◆ Cultural Programs
- ◆ Water Usage
- ◆ Plant Health
 - ◆ Bio stimulants
 - ◆ Precursors
- ◆ Nutrient Delivery
- ◆ Improved Chemistry
- ◆ Improved Application Techniques
- ◆ Genetics

Cultural Programs

Solid Foundation

- ◆ Managing Organic Matter
- ◆ Nutrient Testing
- ◆ Soil Structure



Water Usage

- 💧 Water Availability
- 💧 Water Uptake



Water Availability

Making water wetter

- ◆ Surfactants
 - ◆ Increase water penetration and water holding capacity
 - ◆ Chemistries to provide desired results over a wide range of soils
- ◆ Proper Fertilization
 - ◆ Potassium



Water Uptake

Roots

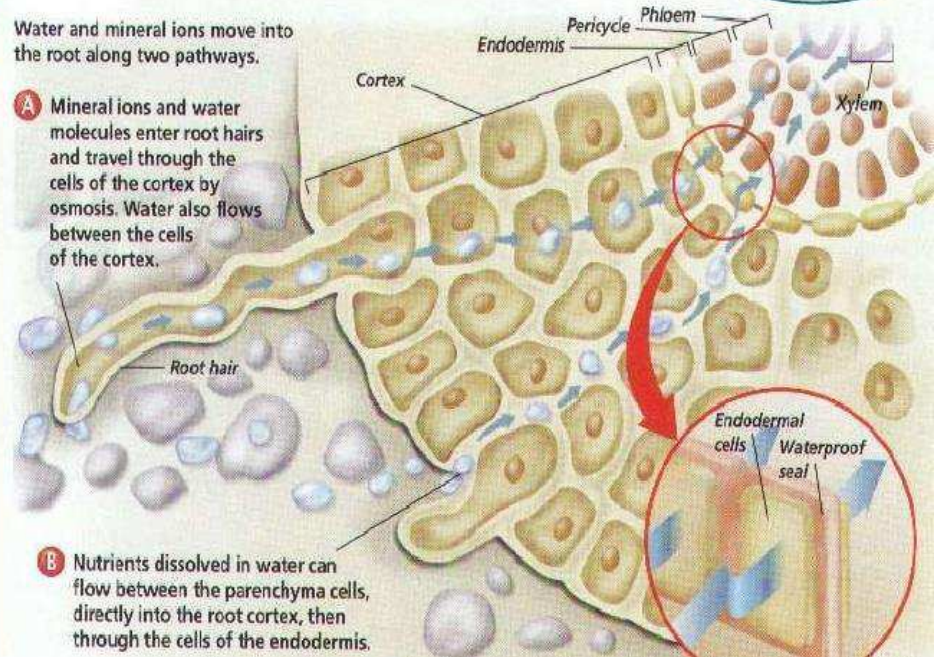
- ◆ Proper Cultural Practices
- ◆ Fertilization
- ◆ Bicarbonate issues

Water uptake in ROOT

Water and mineral ions move into the root along two pathways.

A Mineral ions and water molecules enter root hairs and travel through the cells of the cortex by osmosis. Water also flows between the cells of the cortex.

B Nutrients dissolved in water can flow between the parenchyma cells, directly into the root cortex, then through the cells of the endodermis.



Plant Health

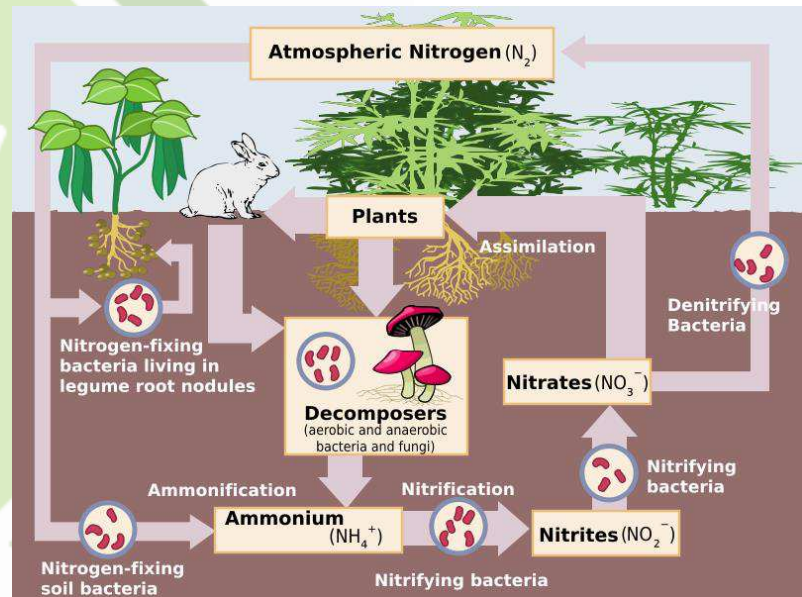
- ◆ Bio Stimulants
 - ◆ Products that impact the soil structure
 - ◆ Microbes
 - ◆ Humic acids
- ◆ Precursors / amendments
 - ◆ Amino acids
 - ◆ Seaweed extracts
 - ◆ Acilobenzolar



Nutrient Delivery

Nitrogen Cycle

- Issues
 - Denitrification
 - Volatilization
 - Leeching
- Stabilized Nitrogen
- Combination products



Improved Chemistry

- ◆ Low use rates
 - ◆ Increased Safety / Groundwater Concerns
- ◆ Specific target pest range
 - ◆ Reduced Non-target Pest Impacts
- ◆ Improved Formulations
 - ◆ Hydrophobic Ionic Liquids (Dicamba)
 - ◆ Combination products (abiotic and biotic stress) acilobenzolar

Improved Chemical Application

- ◆ Improved Nozzle Technology

- ◆ Double Flat Fan

- ◆ Air Induction

- ◆ Coverage Enhancing Products

- ◆ Drift Control

- ◆ Spreader / Stickers

- ◆ <https://youtu.be/DikptM98Wj0>

Turfgrass Water Conservation Alliance

- ◆ TWCA Certifies specific varieties for their desired traits
- ◆ Varieties must be significantly different from traditional varieties
- ◆ 13 research collaborators across North America
- ◆ Must undergo 4 years of testing and all four years of data is used for certification

Rainout Building



Ratings

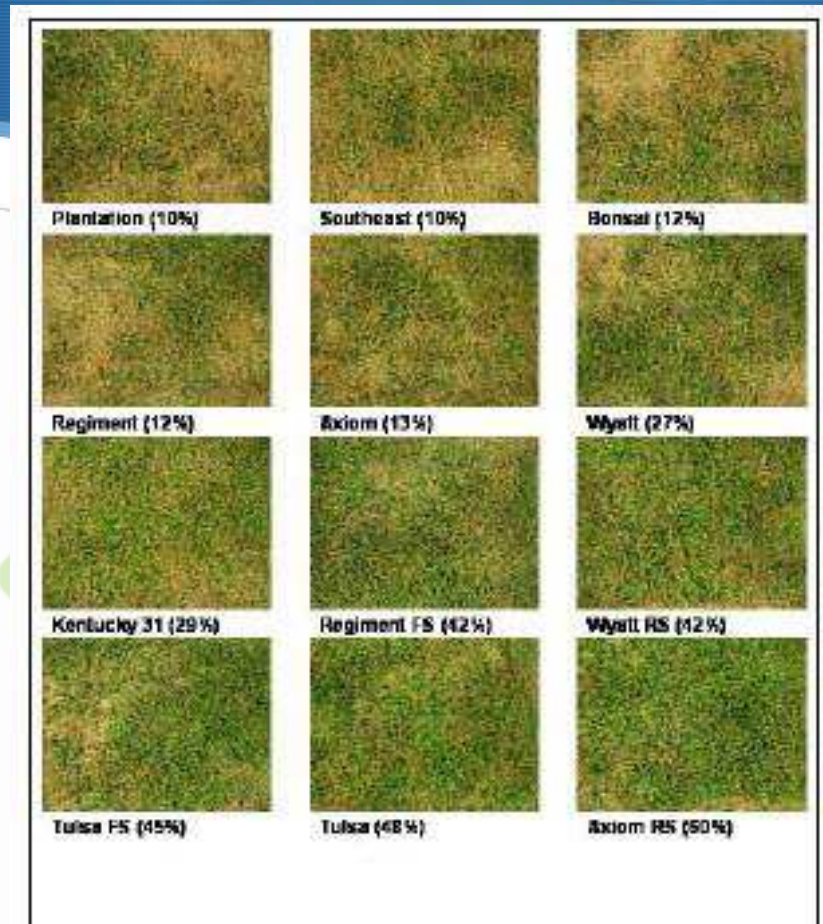
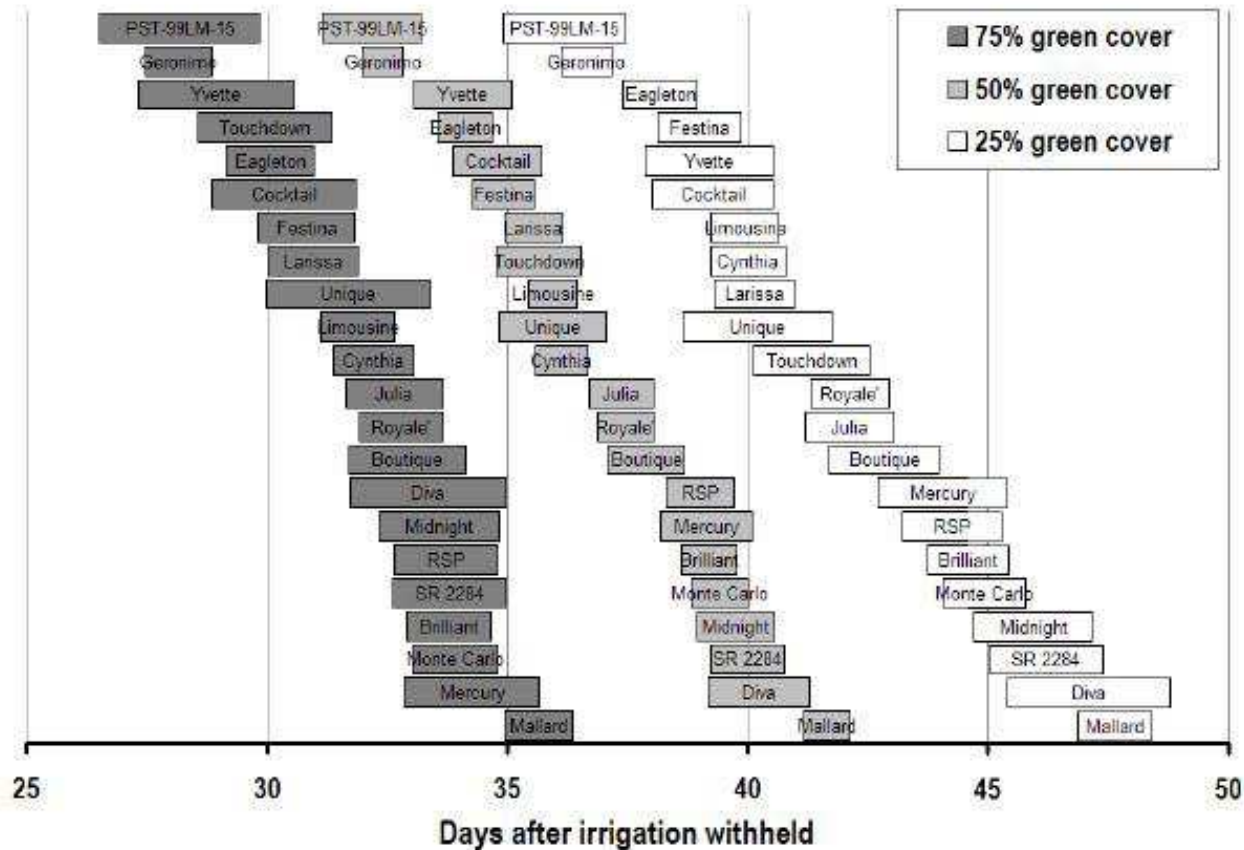


Figure 2 – Differences in % green turf coverage after 50+ days without irrigation

Interval Analysis



ET Rates

Day	Kentucky Bluegrass 2006	Evapo	ET Coeff. 0.5	
	<i>Variety</i>	<i>Total</i>		
35	PST-99LM-15	5.73	0.343	0.172
36	Ulysses	5.90	0.343	0.172
37	Geronimo	6.05	0.301	0.151
38	Champlain, Eagleton, Blue Star	6.21	0.319	0.160
39	Festina, Dragon, P-707, Yvette, Guinness, Cocktail	6.39	0.363	0.182
40	Baron, Moonshine, Preakness, Limousine, Cynthia, Pp H6351, Larissa, Rampart, Unique	6.51	0.246	0.123
41	Midnight Star, Blue Ridge, Touchdown	6.68	0.333	0.167
42	Bedazzled, America, Moonstruck, Brooklawn, Julla, Royale'	6.82	0.289	0.145
43	Boutique, Y2K-136, Princeton P105	7.03	0.416	0.206
44	Midnight II, Mercury, Kingfisher, RSP, Sonic, Blue Angel, 101-376, Brilliant	7.21	0.361	0.181
45	Parade, Monte Carlo, Arcadia, Gimney	7.41	0.397	0.199
46	Midnight, SR 2284	7.52	0.217	0.109
47	Y2K-59, Moonlight, 1QG-38, Diva	7.69	0.354	0.177
48	Mallard	7.79	0.194	0.097

Variety Comparison

Total Geronimo 6.05

Total Mallard 7.79

% Difference 22%



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