

This presentation premiered at WaterSmart Innovations

watersmartinnovations.com





TWCA® Qualified Turfgrasses provide up to 50% Water Savings

TWCA®



Turfgrass Water Conservation Alliance® is a non-profit avenue to test and qualify turfgrass cultivars for improved drought tolerance and educate others based on the research.

In many of societies, turf (grass) has received an undeserved black eye with respect to H_2O



Some Grasses are “WATER HOGS”

Some are not !



Finding Balance

Lawns and Water Conservation

1 acre of trees produces enough oxygen for
18 people

1 acre of grass produces enough oxygen for
64 people

1 acre of rocks produces enough oxygen for
0 people



Water conservation is a serious issue

Benefits of Turfgrass

Recreational

- ❖ Low cost surfaces
- ❖ Physical health
- ❖ Mental health
- ❖ Safety cushion
- ❖ Spectator environment

Functional

- ❖ Soil erosion control
- ❖ Dust prevention
- ❖ Rain water entrapment
- ❖ Heat dissipation
- ❖ Glare reduction
- ❖ Pollutant entrapment
- ❖ Pest reduction
- ❖ Fire prevention
- ❖ Security
- ❖ Environmental protection
- ❖ Carbon Sequestering

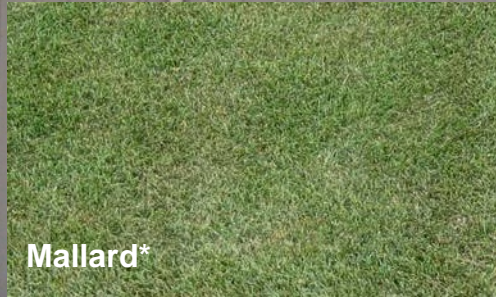
Aesthetic

- ❖ Beauty
- ❖ Quality of life
- ❖ Mental health
- ❖ Social harmony
- ❖ Community pride
- ❖ Increased property values
- ❖ Complements trees and shrubs in landscape

Different ideas of landscape and landscape maintenance which uses more water...



How much water does your lawn use?



Mallard*



Solar Green*

*after 27 days with no water applied Albany, OR 2008

10,000 GALLON WATER TANK

Mallard required 8,800 gallons of water to maintain a 5,000 square foot lawn over the entire summer (90 days).

Solar Green required 19,700 gallons of water to maintain the same area; using nearly two of these tanks over the same time period!

TWCA®



How does the Turfgrass Water Conservation Alliance® conduct their trials?

TWCA



- Non-profit organization formed in 2009
- Based on an accepted protocol (PST, NTEP, AR) since 2002
- Includes four grass seed companies – each participant develops their own brand
- Utilizing 10 rain out structures (OR (3), AR (2), VA, IN, NC, Ontario CAN, & Univ of Laval Quebec, CAN)
- Studies at 7 field trials in arid environments (OR (2), UC Riverside CA, So NJ, Olds College, Alberta, Canada & Univ of UT)

PROTOCOL



- Minimum testing = 2 location/years
- Finish in the top statistical group with Digital Imagery Analysis (DIA) data collections
- Acceptable measure of turf quality
- 3rd party peer review of cultivars
- Comprise a minimum of 60% in blends or mixtures
- More information available at www.tgwca.org

Turfgrass Breeders Trial (CTBT)

- ◆ Heat Tolerance
- ◆ Drought Tolerance
- ◆ Disease
- ◆ Insect
- ◆ Persistence
- ◆ Turf Quality



For more information: www.ctbt-us.info

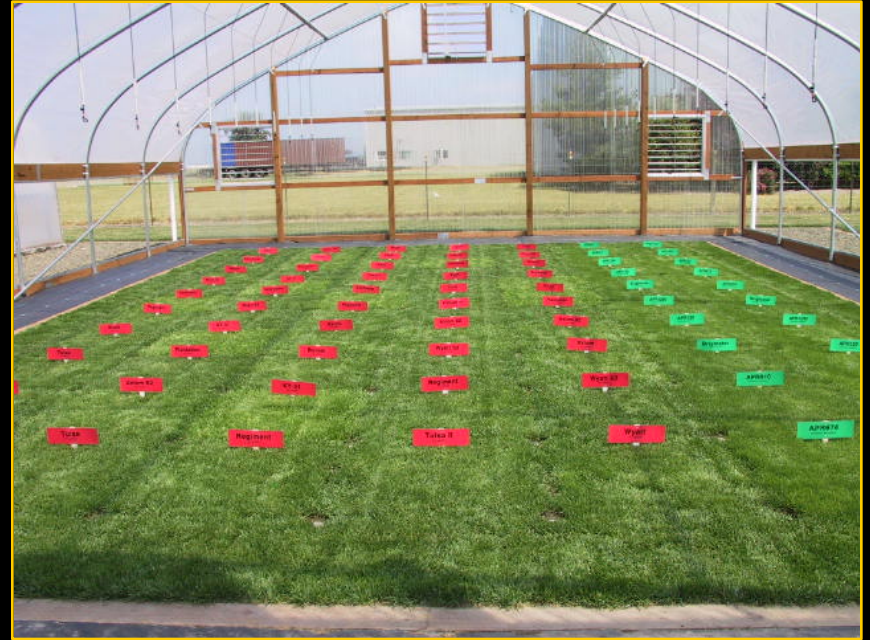
Planting a trial in ROS



A new planting established



RAIN OUT STRUCTURE (ROS)



ROS at Univ of Arkansas



ROS at Univ of Guelph



Disease Trial in NJ



Quality Ratings - Subjective



- Relatively poor correlations exist among researchers ($r < 0.68$)

(Skogley and Sawyer, 1992)
(Horst et al., 1984)



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Light box and digital camera ease of use



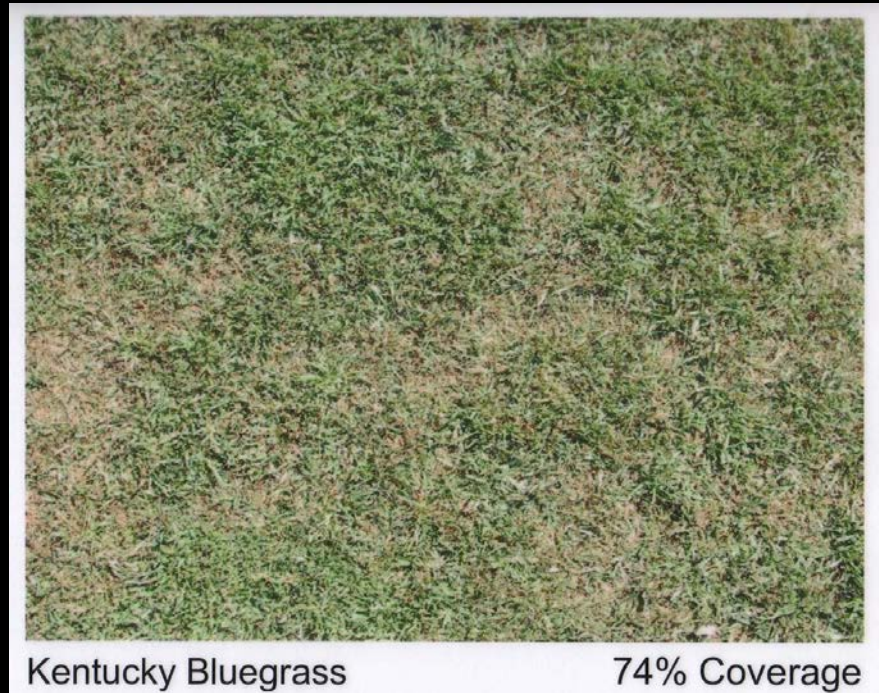
➤ Digital Image Analysis (DIA)

◆ Types of Analysis

- ➔ Color
- ➔ Cover
- ➔ Turf Quality

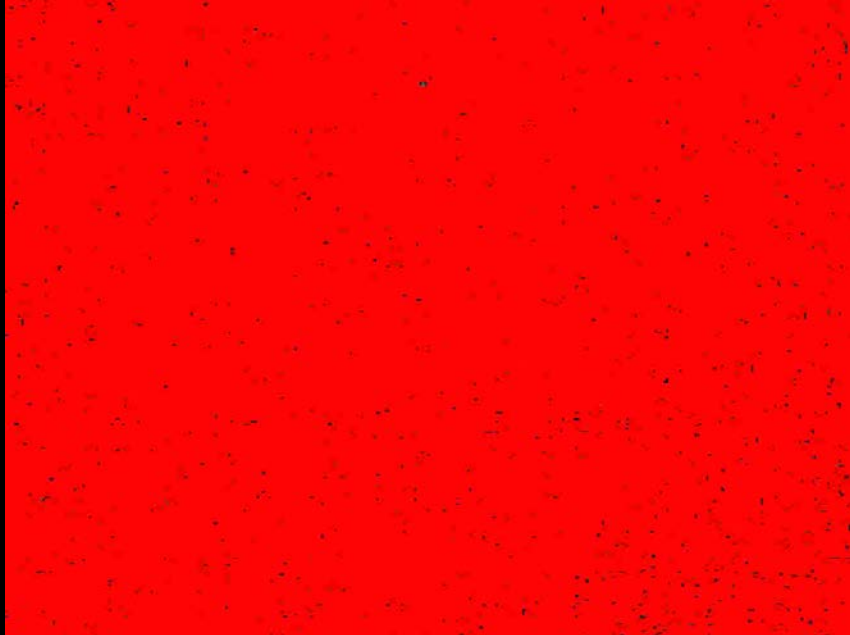
◆ Application

- ➔ Drought
- ➔ Disease
- ➔ Wear
- ➔ Color



Evaluations

- Visual quality ratings (bi-weekly)
 - (1-9 with 9 = optimal turfgrass quality, 6 = acceptable turf)
- Cover analysis using digital images (weekly)
(Richardson et al. 2001)



99.2% green turf cover



28.6% green turf cover



Digital Image Analysis (DIA)

1. Objective vs. Subjective
2. Utilizes 1 to 9 scale
3. 4 Parameters with 1 Evaluation
4. Highly Repeatable
5. Calculate overall turf quality
6. Requires minimal expertise
7. Permanent record on file



Utilization of D.I.A.



Last updated 2010

Kentucky Bluegrass

50 Days With No Water

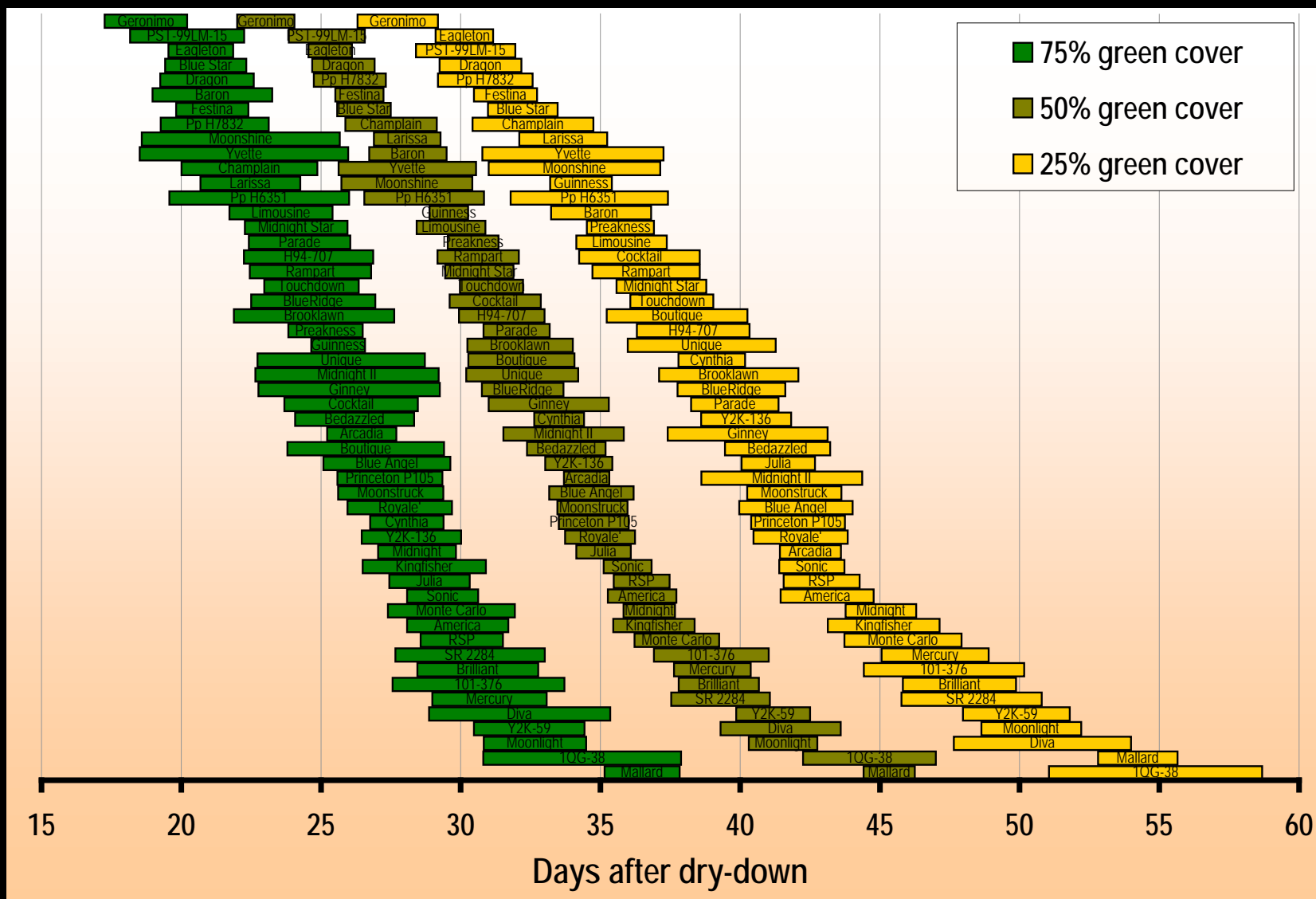


Mallard – 38% Green Cover



Geronimo – 2% Green Cover

Kentucky Bluegrass Data



Water Usage Study



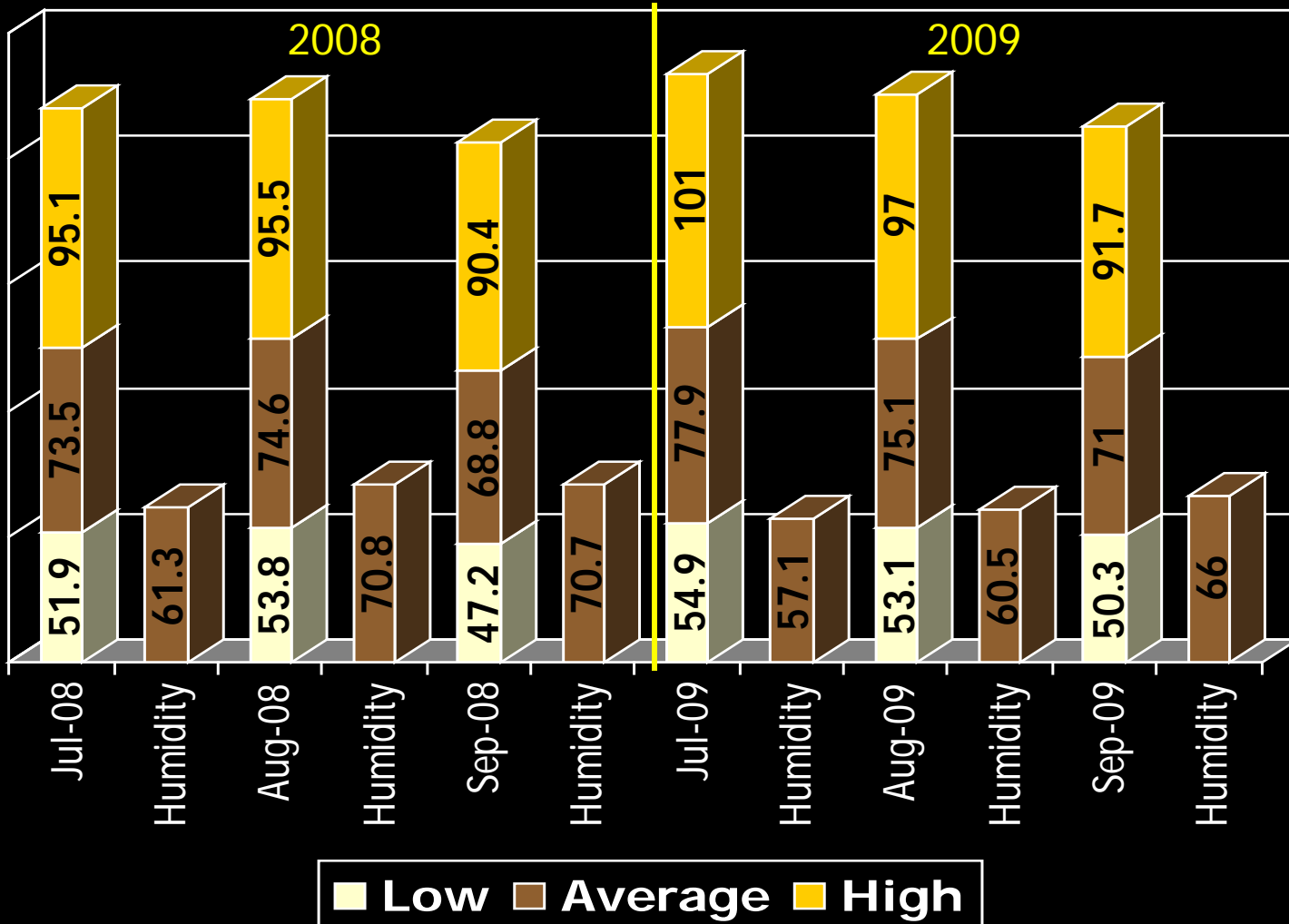
Methods

- Top, middle and bottom cultivars from previous studies selected for testing
- Included Kentucky bluegrass (2 hybrid), tall fescue, perennial ryegrass
- Maintained at a 1” mowing height
- Turf well watered before dry down began
- Turfgrass near 100% green cover at beginning of drought stress
- Dry down period = July 1 – Sept 30 in 2008 & 2009
- Turf watered when the percentage of green cover dropped below 40%

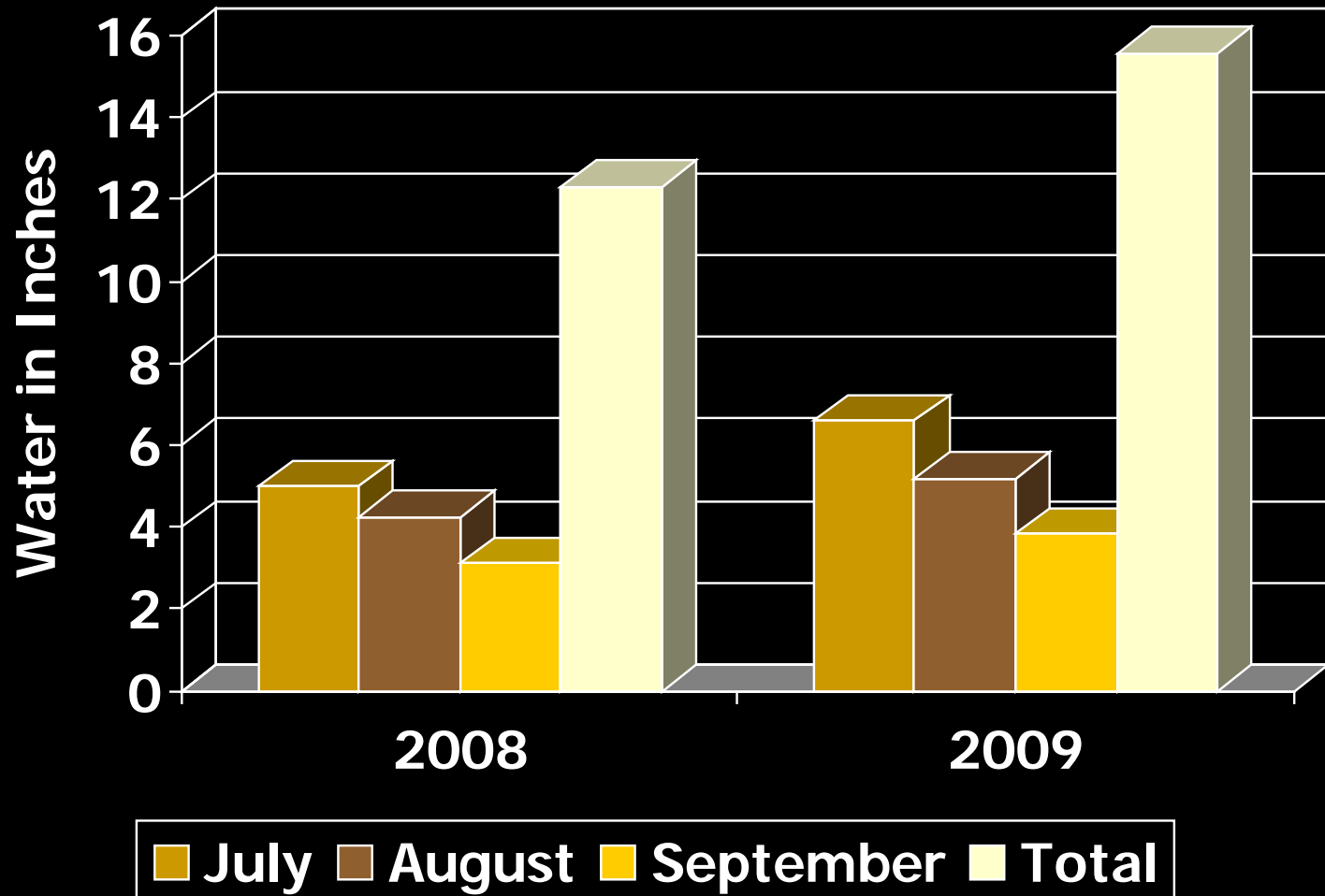
Methods (cont.)

- Withhold water
- Mow 3 times per week at 1”
- Digital photos 24 hours after mowing
- Study continues until top entry is reduced to 25% green cover
- Analyzed using non-linear regression analysis with data fit to a sigmoid curve.

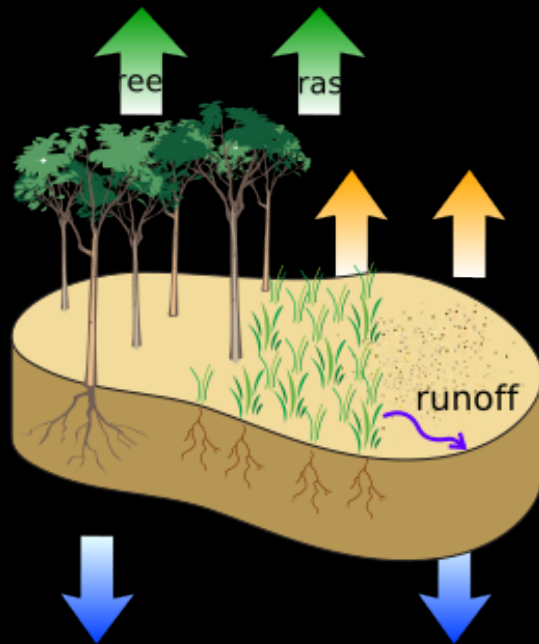
Average Temperatures and Humidity for 2008 and 2009



Evapotranspiration (E.T.) Rates for 2008 and 2009



Evapotranspiration



- 99% water in plant is lost via transpiration
- Policy makers use ET to determine plant water use

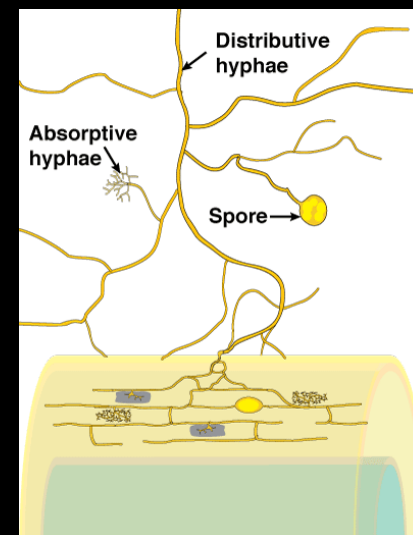
$$ET = \text{Reference ET (ET}_o\text{)} \times \text{Crop coefficient (K}_c\text{)}$$

Assuming a 5,000 square foot lawn, this chart shows the amount of water required to maintain 40% green cover at 90 days in Albany, Oregon. (08/09)

	Cultivar	2008 Water (gallons)	2009 Water (gallons)	08/09 Avg Water (gallons)
Kentucky Bluegrass	Mallard	8,826	6,749	7,788
	Bluestone	11,422	9,864	10,643
	Eagleton	12,460	9,864	11,162
	Midnight	14,017	13,498	13,758
	Reveille	16,094	9,864	12,979
	Solar Green	18,690	14,537	16,613
Ryegrass	APR2105	10,903	20,248	15,575
	Soprano	12,460	16,613	14,537
	Protégé GLR	14,017	16,094	15,056
	Brightstar	16,613	21,286	18,949
Tall Fescue	RK4	3,634	10,383	7,009
	KY-31	5,711	10,383	8,047
	Greystone	5,711	14,018	9,864
	Rebel Exeda	7,788	15,627	11,707
	ATF1258	7,788	10,903	9,345
	Penn 1901	7,788	12,460	10,124

Help from Friends

- ❑ Earthworms
- ❑ Mycorrhizae fungi – water & phosphorous uptake
- ❑ Azospirillum bacteria – brasilense amplifies effect of Arbuscular Mycorrhizae
- ❑ Agrobacterium radiobacter – phosphorus solubilizing bacteria



WE MAY NOT CHANGE THE WORLD
BUT WE CAN MAKE OUR CONTRIBUTION



How can you help?

By Using TWCA[®] Qualified cultivars you can ...

- Save up to 50% water to keep the green
- Use less fertilizer to keep the green
- Use less chemicals to keep the green

WHERE CAN I ACQUIRE THE TWCA[®] VARIETIES

Visit www.tgwca.org

to find a distributor



TWCA®

Finding a Balance with Lawns and Water Conservation



Questions?

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