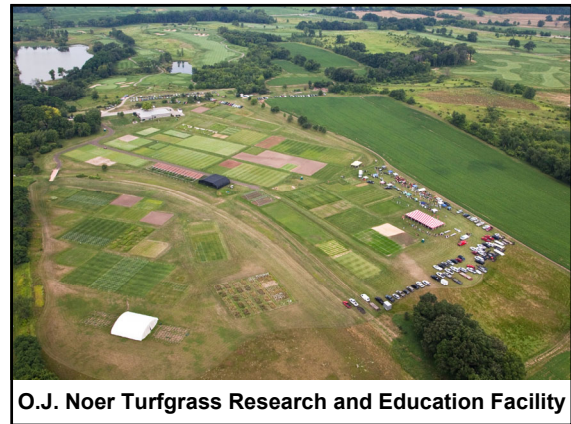
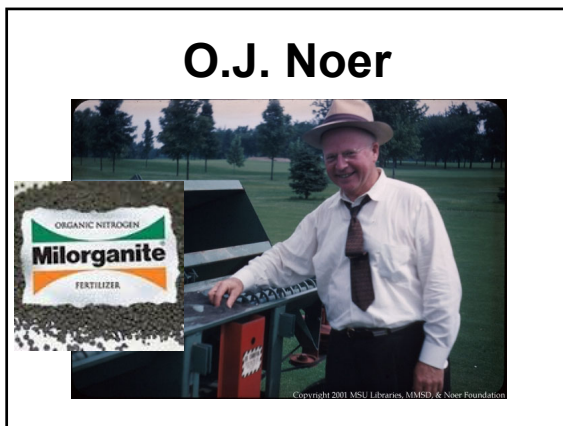


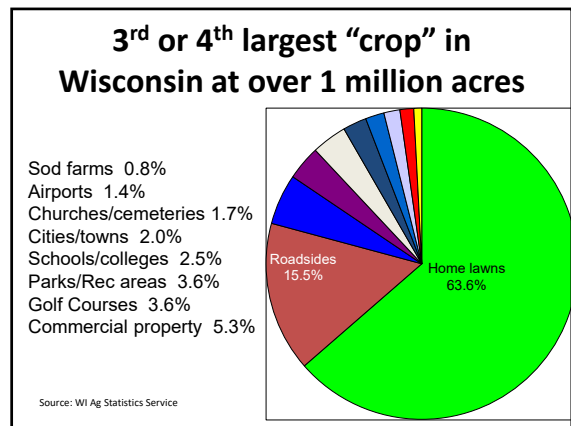
1



2



3



4

Value of Wisconsin Turf

- \$938 million on turf maintenance
- \$2.7 billion spent on turf equipment
- 454 Golf courses: \$20 million in taxes paid
- 92% of homeowners rated lawns as important to them

Source: WI Ag Statistics Service, 1999

5

Turf vs. Turfgrass

- Turf: A contiguous community of plants that persists under routine traffic and defoliation
- Turfgrass: turf forming grass
- Over 7,500 species of grass – less than 30 are turfgrasses

6

The Miocene Epoch

- 24 to 5 million years ago
- Forests shrunk, grasslands expanded. Animals adapted to eat grass, grasses adapted to being eaten.



7

Grass stains on our genes?

Science News

Blog Cite

Six Million Years of Savanna: Grasslands, Wooded Grasslands Accompanied Human Evolution

ScienceDaily (Aug. 3, 2011) — University of Utah scientists used chemical isotopes in ancient soil to measure prehistoric tree cover — in effect, shade — and found that grassy, tree-dotted savannas prevailed at most East African sites where human ancestors and their ape relatives evolved during the past 6 million years.

See Also:

Plants & Animals

• Soil Types

• Nature

Earth & Climate

• Grassland

• Forest

Fossils & Ruins

• Fossils

• Early Humans

Reference

• Savanna

"We've been able to quantify how much shade was available in the geological past," says geochemist Thure Cerling, senior author of a study of the new method in the journal *Nature*. "And it shows there have been open habitats for all of the last 6 million years in the environments in eastern Africa where some of the most significant early human fossils were found."

"Wherever we find human ancestors, we find evidence for open habitats similar to savannas — much more open and savanna-like than



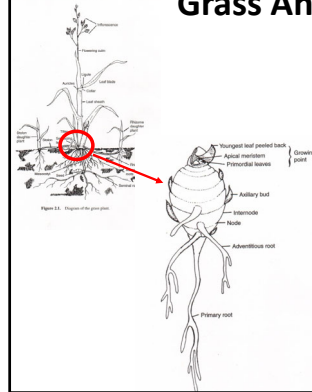
An East African savanna landscape of tree-dotted grassland is shown in this image from Samburu National Reserve in Kenya. The more heavily vegetated area in the middle distance is the corridor of the Ewaso Ng'ro River. A new University of Utah study concludes that savanna was the predominant ecosystem during the evolution of human ancestors and their chimp and gorilla relatives in East Africa. (Credit: Thure Cerling, University of Utah)

8



9

Grass Anatomy



Crown:

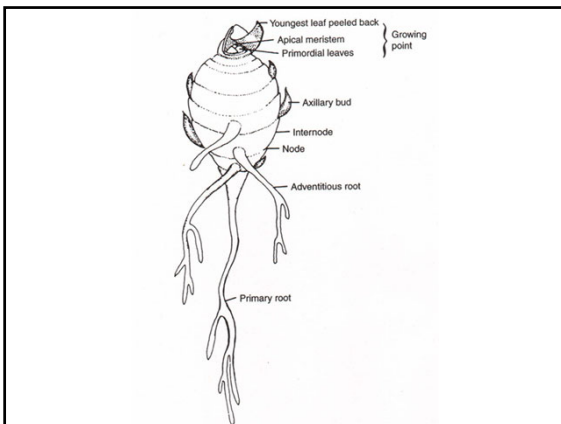
Compressed stem; growing pt.

Apical meristem: 1-3 mm at top = leaf primordia

Axillary buds: tillers, stolons, rhizomes

Root primordia

10



11

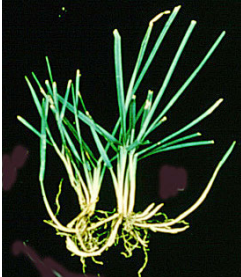
Bunch-Type Growth Habit

- spread by **tillering** — Uniformity is problem long term or at low seeding rates
- Tall fescue, ryegrass, fine fescues



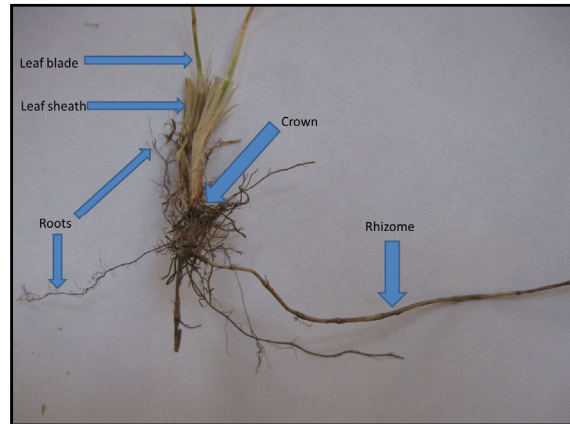
12

Rhizomatous Growth Habit



- Rhizomes are:
 - Belowground lateral shoots
 - Storage organs
- Kentucky bluegrass, creeping red fescue (weak!)

13



14

Quackgrass



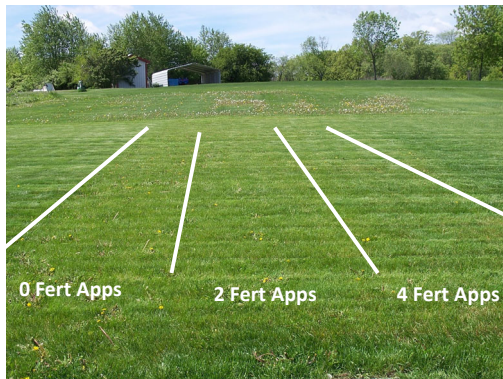
15

Grass Selection



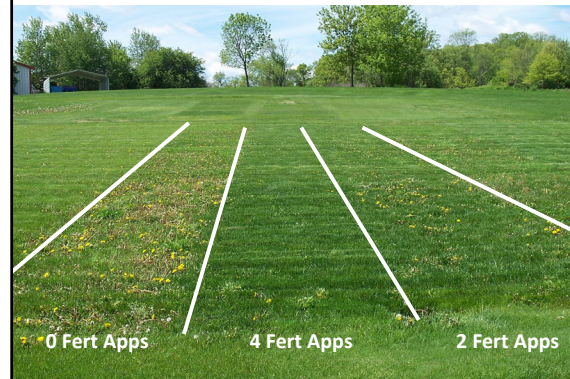
16

Common Kentucky Bluegrass

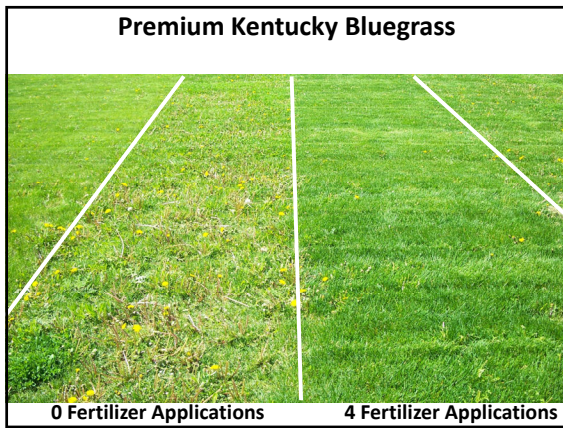


17

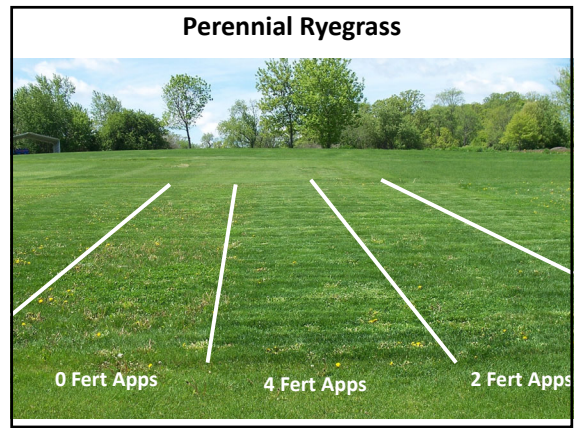
Premium Kentucky Bluegrass



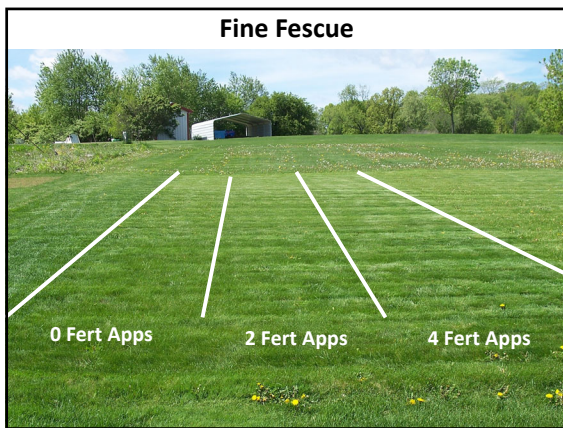
18



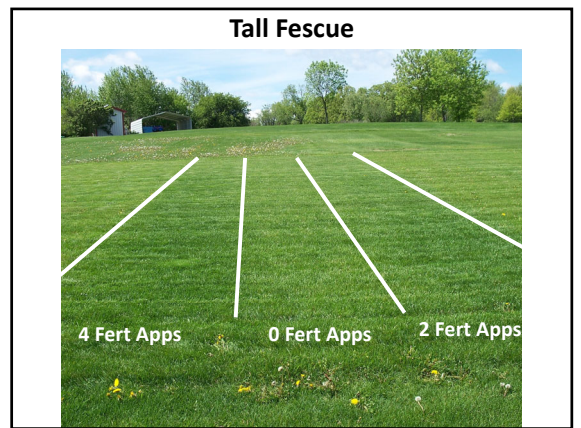
19



20



21



22



23

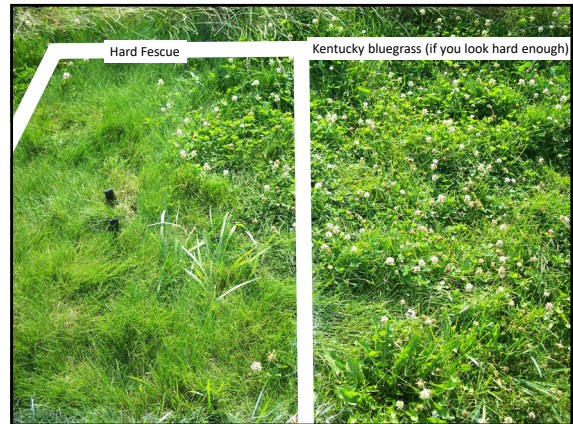
**Low Input Sustainable
Turfgrass Research**

- No inputs, aside from monthly mowing
- Soil: outstanding quality (deep, fertile, no compaction)

24



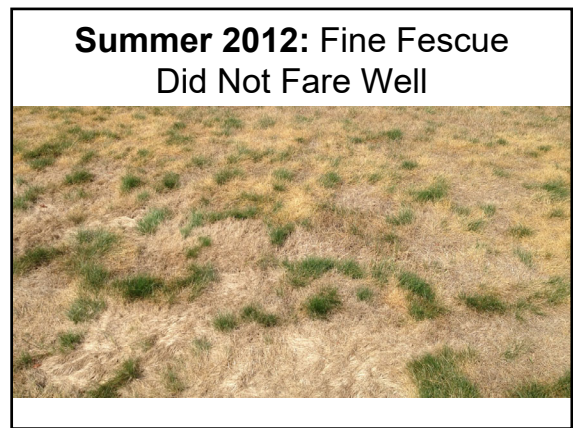
25



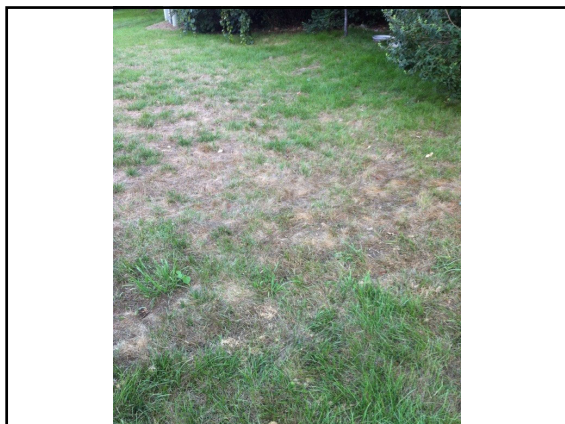
26



27



28



29



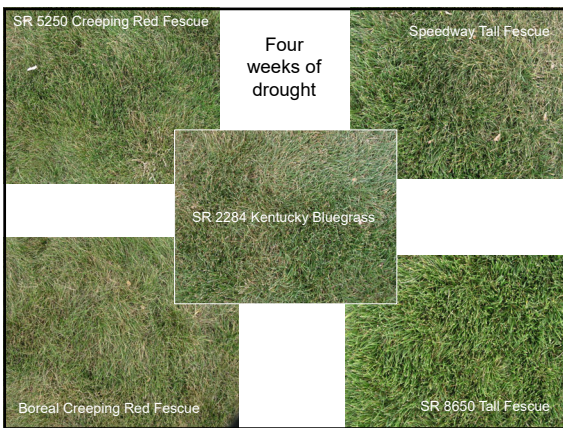
30



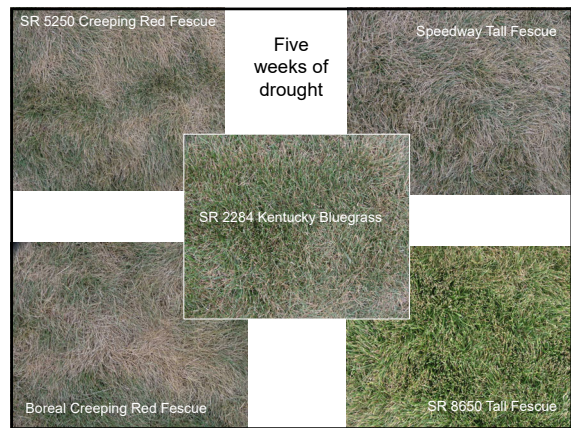
31



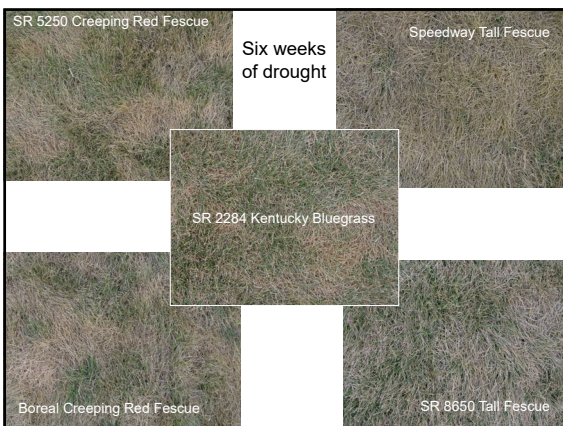
32



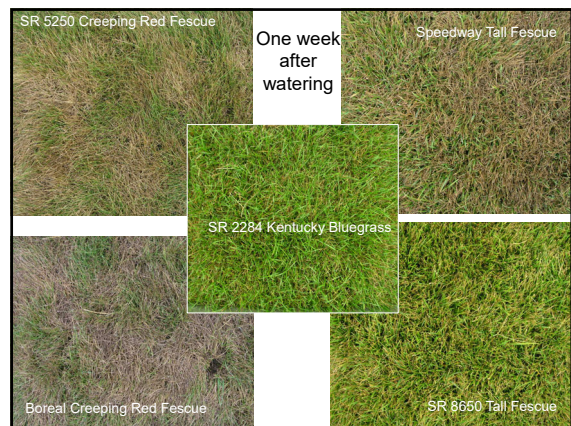
33



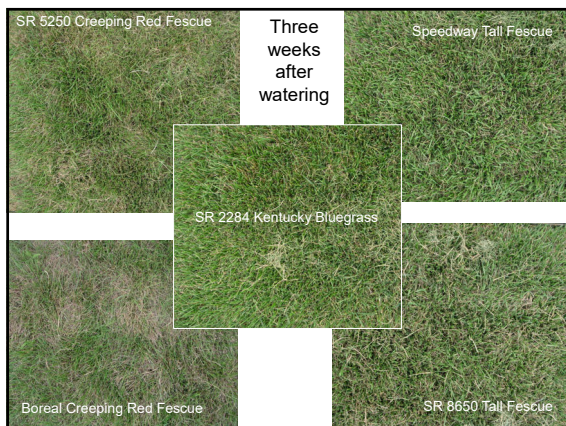
34



35



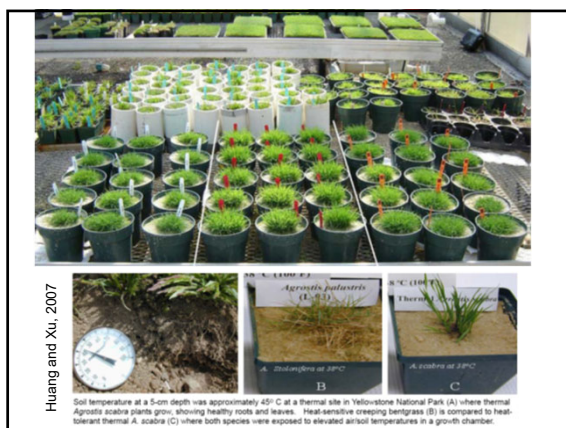
36



37



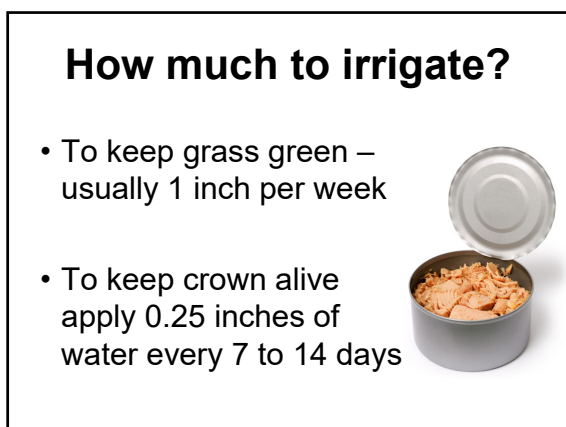
38



39



40



41



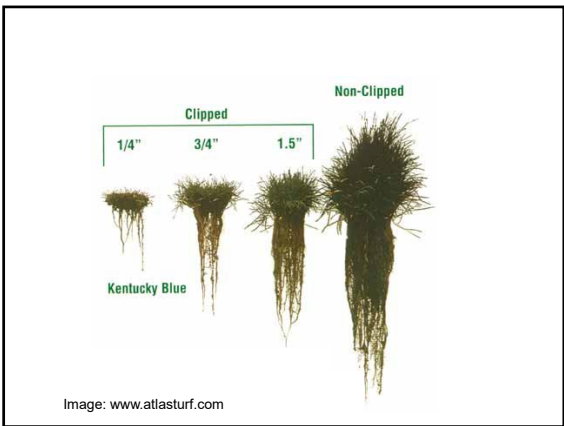
42



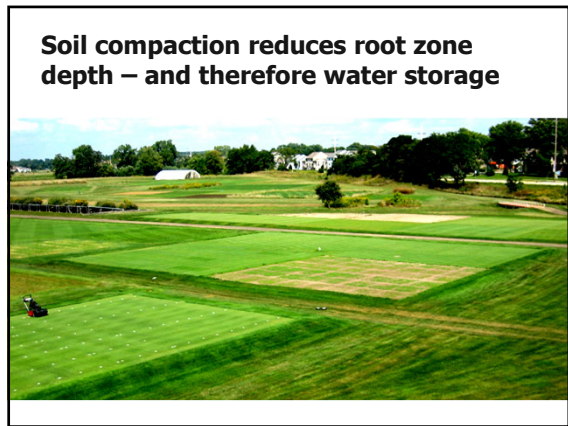
43



44



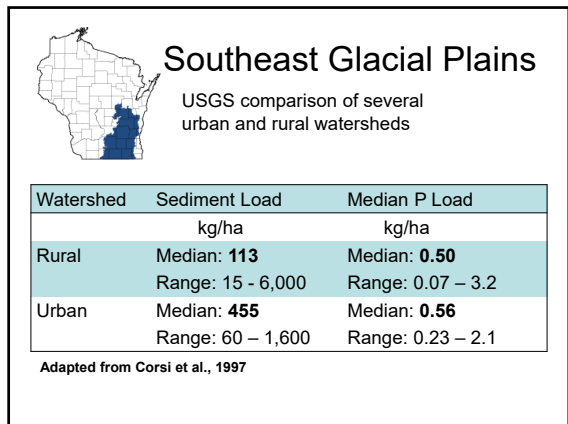
45



46



47

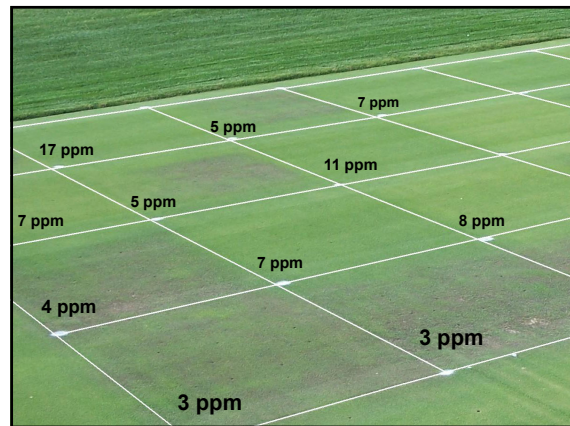


48

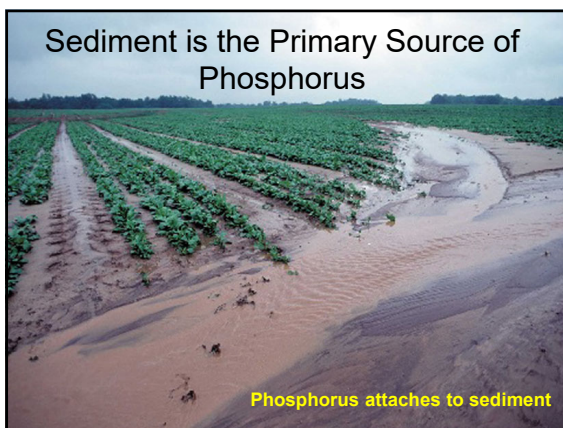


- Phosphorus-containing fertilizer prohibited unless:
 - Have a soil test showing a need
 - Establishing a new lawn
 - Using an natural/organic fertilizer

49



50



Sediment is the Primary Source of Phosphorus

Phosphorus attaches to sediment

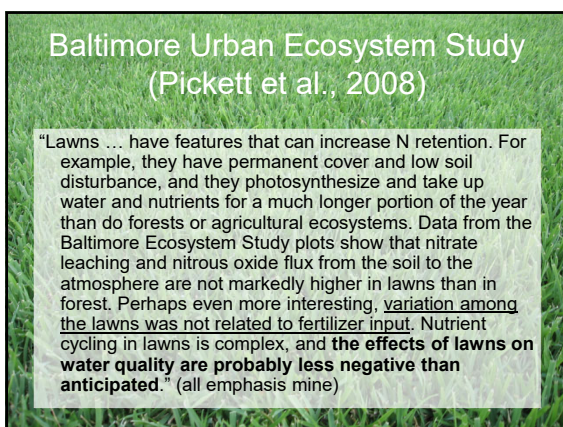
51



A Dense Ground Cover is Good for the Urban Environment

- Reduces runoff
- Reduces sediment losses
- Reduces nutrient losses
- Sequesters carbon
- Increases groundwater recharge

52



Baltimore Urban Ecosystem Study (Pickett et al., 2008)

"Lawns ... have features that can increase N retention. For example, they have permanent cover and low soil disturbance, and they photosynthesize and take up water and nutrients for a much longer portion of the year than do forests or agricultural ecosystems. Data from the Baltimore Ecosystem Study plots show that nitrate leaching and nitrous oxide flux from the soil to the atmosphere are not markedly higher in lawns than in forest. Perhaps even more interesting, variation among the lawns was not related to fertilizer input. Nutrient cycling in lawns is complex, and the effects of lawns on water quality are probably less negative than anticipated." (all emphasis mine)

53

Fertilization Effect on Phosphorus Losses from Turf		
Fertilization Program	Water runoff	Phosphorus loss
	Inches/yr	lb/A/yr
No fertilizer for two year	1.55 a	0.41 a
Three times per year Milorganite (6-2-0)	1.04 b	0.25 b
Three times per year Scotts Turf Builder	1.07 b	0.25 b

Source: Kussow, 1997

54

University of Minnesota Research

- Three year study of runoff under various clipping management and fertilizer regimes
 - Unfertilized turf had greater runoff P than fertilized turf (zero P)
 - Zero P fertilized turf had less runoff P than turf fertilized with a complete fertilizer

Photo: B.P. Horgan
Bierman et al., 2010

55



56



57



58

Applying Compost

A 1 inch layer of compost provided the same or more nitrogen than a four-step program; and several times more than the recommended amount of phosphorus

59

Infiltration Rates After 3 Years		
Treatments	Buffalo	Rochester
	-----in/hr-----	
Poultry 1"	17 A	9 A
Dairy 1"	10 AB	6 AB
Poultry 1/2"	14 AB	5 B
Dairy 1/2"	9 AB	4 B
Fertilizer	5 B	4 B
Control	5 B	3 B

60

Recommended Timings Based on Research

- Sunny Lawn
 - **Memorial Day** (late May)
 - Resist the temptation to fertilize earlier
 - **July 4th** (mid-summer)
 - Do not make this application if grass is brown or wilting from drought
 - Organic and other slow release fertilizers the best choice at this time
 - **Labor Day** (early Sept.)
 - Fertilizing later in the year is less efficient

61

Recommended Timings Based on Research

- Shady Lawn or Older Lawn (>15 yrs)
 - **Memorial Day** (late May)
 - Resist the temptation to fertilize earlier
 - **Labor Day** (early Sept.)
 - Fertilizing later in the year is less efficient

62

Mowing Practices

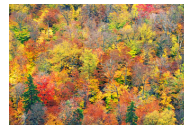
- Proper height
 - Lawns: 2.5 to 3.5 inches
 - Stimulate dense turf
- Sharp mower blades
 - Turf heals faster
 - Less disease
 - Better appearance
- Good Mowing Practices Reduce Weeds



63

Weed Control

- Annual weeds like crabgrass can be prevented using a pre-emergent herbicide when forsythia are in full bloom
- Perennial weeds can be controlled near the time of first frost and/or during spring flowering phase



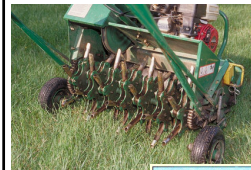
64

Insect Control

- **Understanding the life cycle of the insect is critical**
 - Is it a below ground feeder or above ground feeder?
 - Have the insect identified before selecting proper control
- White grubs are most common insect pest and are best controlled around 4th of July

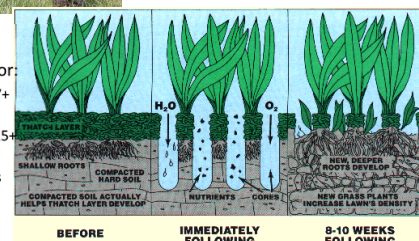
65

Core Aerating or Core Cultivation



Best done in fall
Recommended for:

- Sodded lawns (7+ years old)
- Seeded lawns (15+ years old)
- Compacted soils
- Good time to overseed



66



Slit Seeder

67



68

Turfgrass Diagnostic Laboratory

<http://tdl.wisc.edu/>

UW SEARCH

TDL
TURFGRASS DIAGNOSTIC LAB

Home
Sample Submission
Fees
Contract Membership
Disease Keys
Research

O.J. Noer Turfgrass Research and Education Facility
2502 County Highway M
Verona, WI 53593

Directions

Office Hours:

The Turfgrass Diagnostic Lab (TDL) provides fast and accurate diagnostic information and management recommendations for all turf health issues concerning both commercial turfgrass managers and homeowners. Proper diagnosis and management can

News

- Pay your sample fees or contract membership right now! Click here to pay online with your credit card.
- 2011 Snow Mold Reports with pictures and more

69

Summary

- Some maintenance is a good thing! Turf density is important for improving water infiltration.
- Pick the right grass – some require more maintenance than others.
- Don't forget about the soil.

70

For More Information:

Doug Soldat
djsoldat@wisc.edu
608-263-3631

UWEX Learning Store
learningstore.uwex.edu/

Organic and reduced-risk lawn care

People who wish to move in the direction of creating an organic lawn, or what some people call a natural lawn, have two options: organic lawn care or reduced-risk lawn care.

Lawn maintenance

Organic lawn care

Organic lawn care is a natural approach to lawn care that uses natural materials and methods to maintain a healthy lawn. It is a sustainable and environmentally friendly way to care for your lawn.

Organic lawn care

Organic lawn care is a natural approach to lawn care that uses natural materials and methods to maintain a healthy lawn. It is a sustainable and environmentally friendly way to care for your lawn.

71