STMA 308: Diagnosing Turf Problems

Pamela J Sherratt
The Ohio State University

THE OHIO STATE UNIVERSITY EXTENSION

Predicting Turf Problems & Catching them Early

- **Identification skills**
- **Environmental data**
  - **Prediction Models**
- **Phenology**
- **Growing Degree Days (GDD)**
- **Traps**
- **Scouting/monitoring**
- **Turf flushing**
- **Lab tests**
- **Continuing education**

3 Standard Control Strategies

1. Know your enemy!
2. Identify strong & weak points
   - Life cycle (emergence etc.,)
   - Susceptibility to herbicide
3. Use a variety of tactics
   - Cultural control
   - Rotating herbicides
     - Synthetic
     - Natural organic

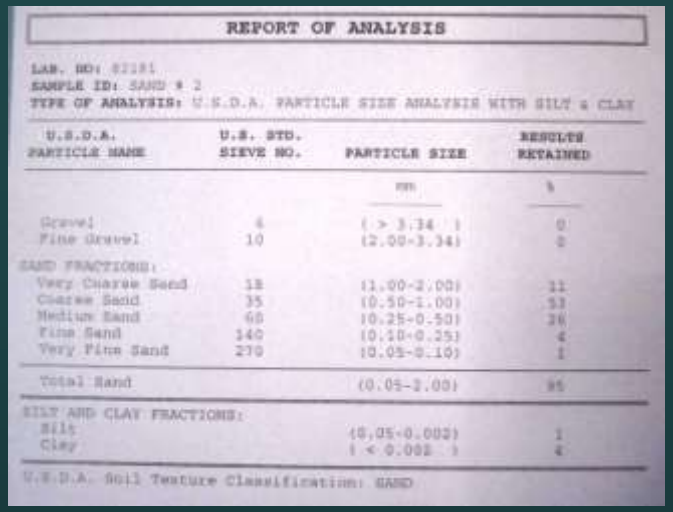
Turf Health

- Vigor
- Quality: color, density, & texture
- Root length & volume

Measuring Soil & Turf Health

- Soil fauna (arthropods, fungi & bacteria)
- Nutrient status
  - Soil chemical tests
  - Tissue tests
  - Soil OM test
    - SOC (carbon sequestration)
- Drainage
  - Particle size analysis
  - Total, air-filled, & capillary porosity
  - FM, CU, & sphericity/angularity of sand faction
  - Ksat

Soil Physical and Chemical Tests



REPORT OF ANALYSIS

LAB. NO: 82181
SAMPLE ID: SAND # 2
TYPE OF ANALYSIS: U.S.D.A. PARTICLE SIZE ANALYSIS WITH SILT & CLAY

U.S.D.A. PARTICLE NAME	U.S. STD. SIEVE NO.	PARTICLE SIZE mm	RESULTS RETAINED %
Gravel	4	(> 3.34)	0
Fine Gravel	10	(2.00-3.34)	0
SAND FRACTIONS:			
Very Coarse Sand	18	(1.00-2.00)	11
Coarse Sand	35	(0.50-1.00)	53
Medium Sand	60	(0.25-0.50)	26
Fine Sand	140	(0.10-0.25)	4
Very Fine Sand	270	(0.05-0.10)	1
Total Sand		(0.05-2.00)	95
SILT AND CLAY FRACTIONS:			
Silt		(0.05-0.002)	1
Clay		(< 0.002)	4

U.S.D.A. Soil Texture Classification: SAND

REPORT REF. NUMBER	RESULTS OF ANALYSIS						CALCULATED VALUES					
	Soil pH	Buffer pH	Pounds per Acre Available Nutrient				Cation Exchange Capacity	% Base Saturation				
LAB NO.			P	K	Ca	Mg		K	Ca	Mg	H	Na
1 682170	6.5		101	304	4211	622	13.5	2.9	78	19		
2												
3												
4												
5												
6												
7												
8												
9												
10												
11 AVERAGE RESULTS →			101	304	4211	622	13.5	2.9	78	19		

DISPLAY OF AVERAGE RESULTS

SURPLUS										
HIGH	* *	*		*			*			
MEDIUM	* * *	* * *	*	* * *	*	*	* * *	* *		
LOW	* * *	* * *	*	* * *	*	*	* * *	* *		

Table 1. Examples of Some Typical Gmax values
(based on ASTM F-355, Proc. A).

Gymnastics mat	30 to 60
Infill synthetic system with 100% rubber and shock pad	80 to 100
Infill synthetic system with 100% rubber and no shock pad	90 to 125
Uncompacted, pristine natural turf athletic field	100 to 130
Traditional carpeted synthetic field with pad on asphalt	100 to 150
Infill synthetic system with 75 %: 25 % rubber: sand	105 to 145
Infill synthetic system with 50 %: 50 % rubber: sand	120 to 160
Infill synthetic system with 25 %: 75 % rubber: sand	160 to 185
Infill synthetic system with 100 % sand	160 to 185
Carpeting and padding over wood	200 to 300
Football helmet may fail impact energy management	>300
High density rubber floor mat on concrete floor	300 to 400
Compacted or frozen natural turf	400 to 500
Concrete floor	> 1000

Thatch dilution

Helpful Tools

Parameters	Perennial Ryegrass (C3)	Bermudagrass (C4)
Optimum Shoot Growth	59 – 75 F 15 – 24 C	81 – 95 F 27 – 35 C
Optimum Root Growth	50 – 64 F 10 – 18 C	75 – 84 F 24 – 29 C
Optimum Photosynthesis	77 F 25 C	95 F 35 C

Table 1. Soil Temperatures for Annual Weed Germination.

Weed	Scientific Name	Critical Soil Temperature °F	Critical Soil Temperature °C
Prostrate knotweed	Polygonum aviculare	As low as 41	5
Annual bluegrass	Poa annua	45	8
Large & Smooth Crabgrass	Digitaria sanguinalis and ischaemum	50-55	10-13
Goosegrass	Eleusine indica	60-65	15-18

Coca-Cola

http://ppdc.osu.edu/

The C. Wayne Ellet Plant and Pest Diagnostic Clinic

THE OHIO STATE UNIVERSITY EXTENSION | THE OHIO STATE UNIVERSITY OARDC

- Home
- About
- Selecting Samples
- Mailing Samples
- Forms
- Links
- Fees
- Map
- Spotlight

Best viewed at 1024x768 or higher

The Plant and Pest Diagnostic Clinic (PPDC) is a leading diagnostic service with state-of-the art diagnostic facilities and testing procedures. An experienced staff integrates resources from entomology and plant pathology to provide accurate and complete diagnoses of plant related questions. This team is supplemented by specialists on campus plus OARDC in Wooster, as well as other educational institutions.

The PPDC supports county extension programs by aiding in identification and diagnosis of plant diseases, insects, and environmental disorders. In addition to sample work, the PPDC also engages in seminars throughout the state and provides information and support for researchers and growers.

We provide these services...

- Plant disease diagnosis: fungal, bacterial, viral
- Insect identification
- Plant and weed identification
- Evaluate environmental damage
- Chemical injury symptom diagnosis
- Aquatic weed identification
- Recommendations provided for mar

...Which apply to...

- Greenhouse and nursery crops
- Landscape trees, shrubs, and flowers

TURFGRASS FEES

Samples submitted by Homeowners - $20 per sample

Commercially Managed Ohio Turfgrass - $80 per sample

Out-of-State Turfgrass - $100 per sample

Turfgrass Diseases Diagnosis

Buckeye Sports Turf Field Evaluation Document (FED)

http://hcs.osu.edu/sportsturf/bst/graphics/FEDGuidelines.pdf

http://hcs.osu.edu/sportsturf/bst/graphics/FEDReportCard.pdf

Playing Conditions Index

STMA.org

http://www.oardc.ohio-state.edu/newweather/
Google
Apple Yahoo! Google Maps YouTube Wikipedia News (290) Popular

OARDC
Weather System

Ashtabula
Avon
Columbus
Delaware
Eastern
Jackson
Madison
Mahoning*
Miami*
Mt Vernon*
Muck Crops
North Central
Northwest
Perry
Piketon
Southern*
Western
Wooster
***Archived stations**

Instrumentation
FAQ

OARDC
Centernet

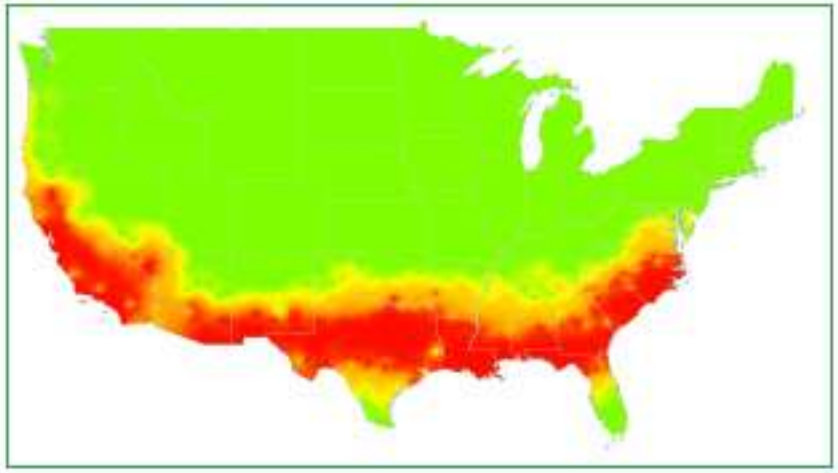
Pest Outlook Maps

Poa Annua Germination - National

Print: Email:

Utilize this highly accurate historical data to help you stay ahead of weeds, disease, and pests. Click on the interactive map to zoom in and see the pest outlook for your area or use the menu and select a region. You can even see pest forecasts for the next two days.

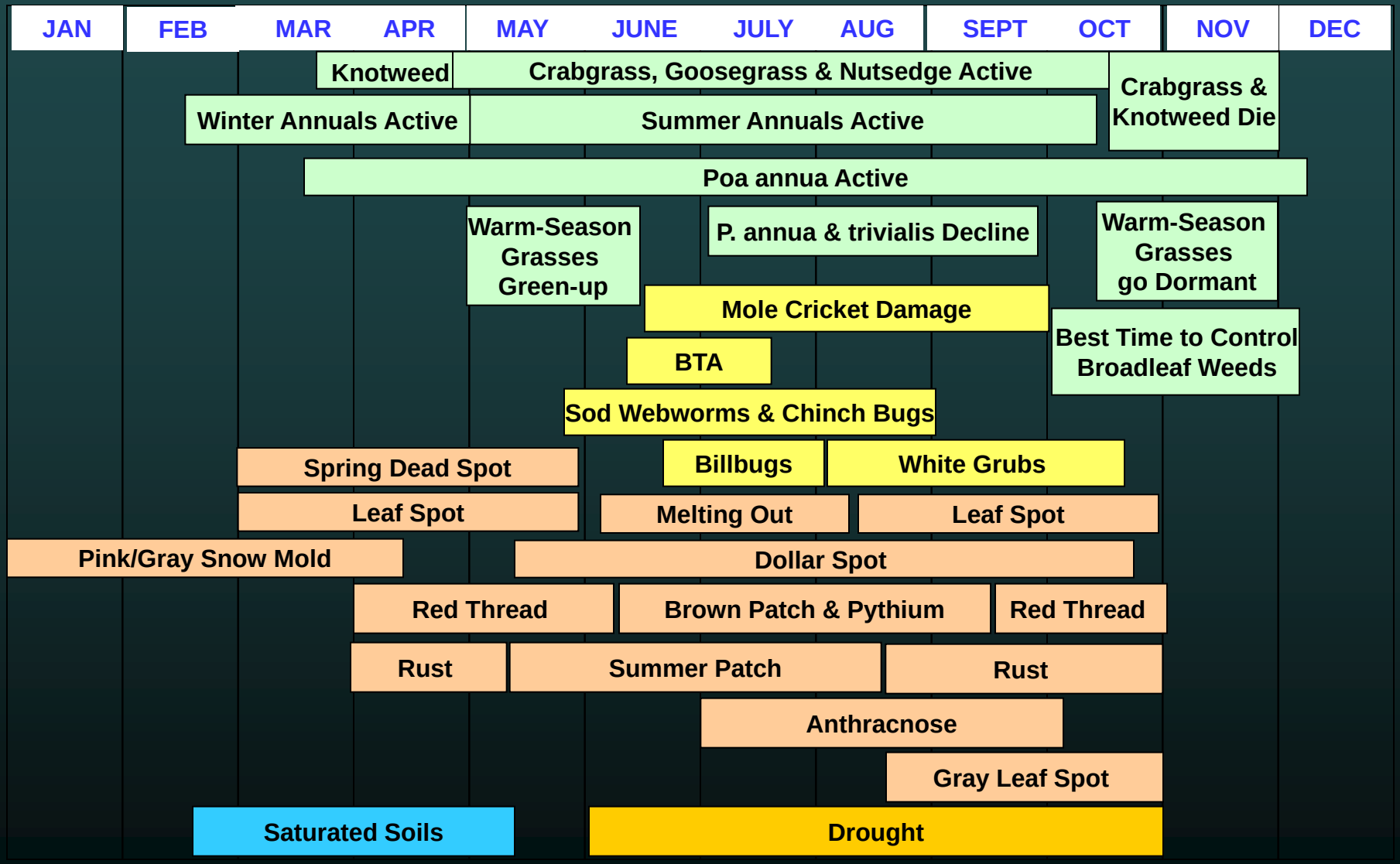
Poa Annua Germination - National



Map Generated on 4/10/2008

Poa Annua Germination - National Forecast Maps

BASIC P,D & W DIAGNOSTICS



Designation: D 5268 – 92

Standard Specification for Topsoil Used for Landscaping Purposes

This standard is issued under the fixed designation D 5268; the number immediate
original adoption or, in the case of revision, the year of last revision. A number in p
superscript epsilon (ε) indicates an editorial change since the last revision or reapp

. Scope

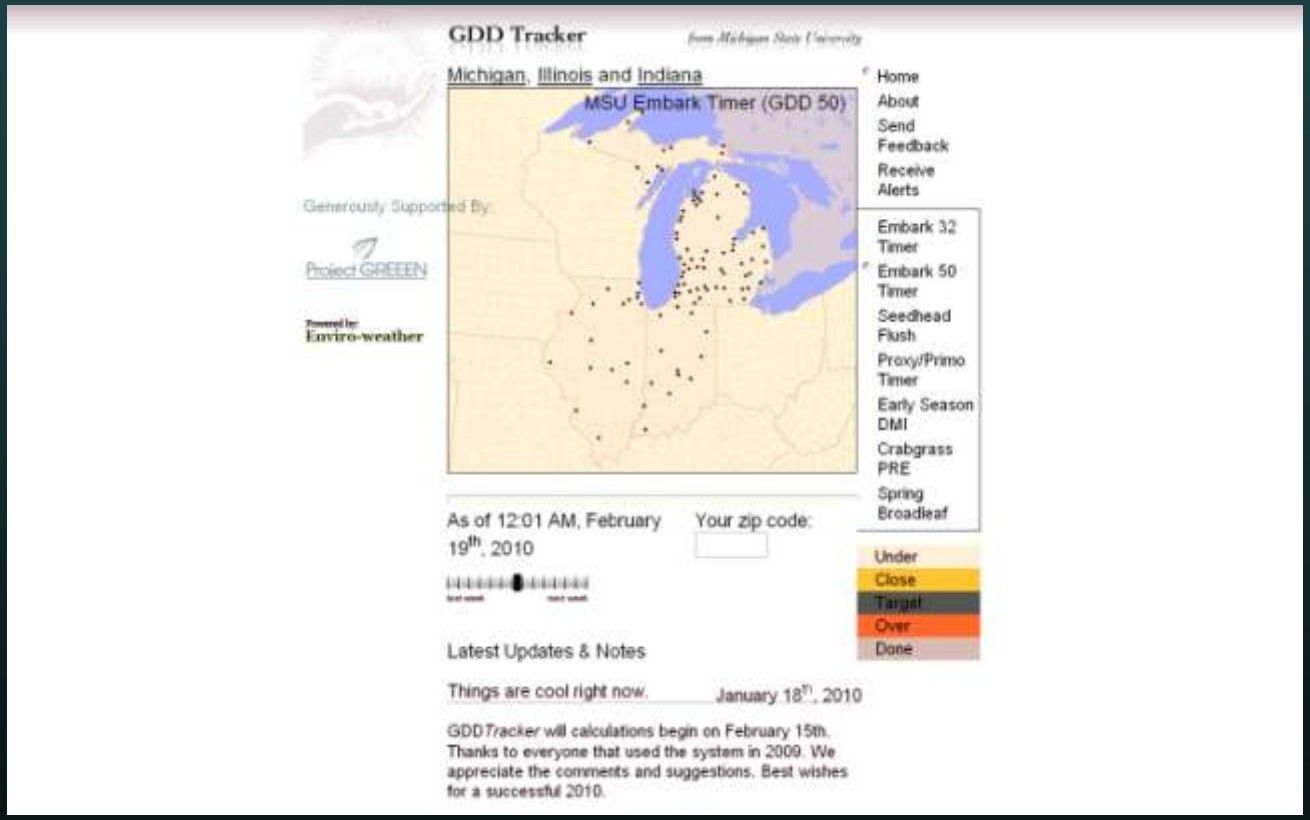
1.1 This specification covers a physical evaluation of an organic soil containing a limited amount of organic aterial, relative to its use as a topsoil for horticultural rposes in construction. For classification, a full agricul- ral textural classification may be used.

1.2 The presence in the soil of the correct nutrients and

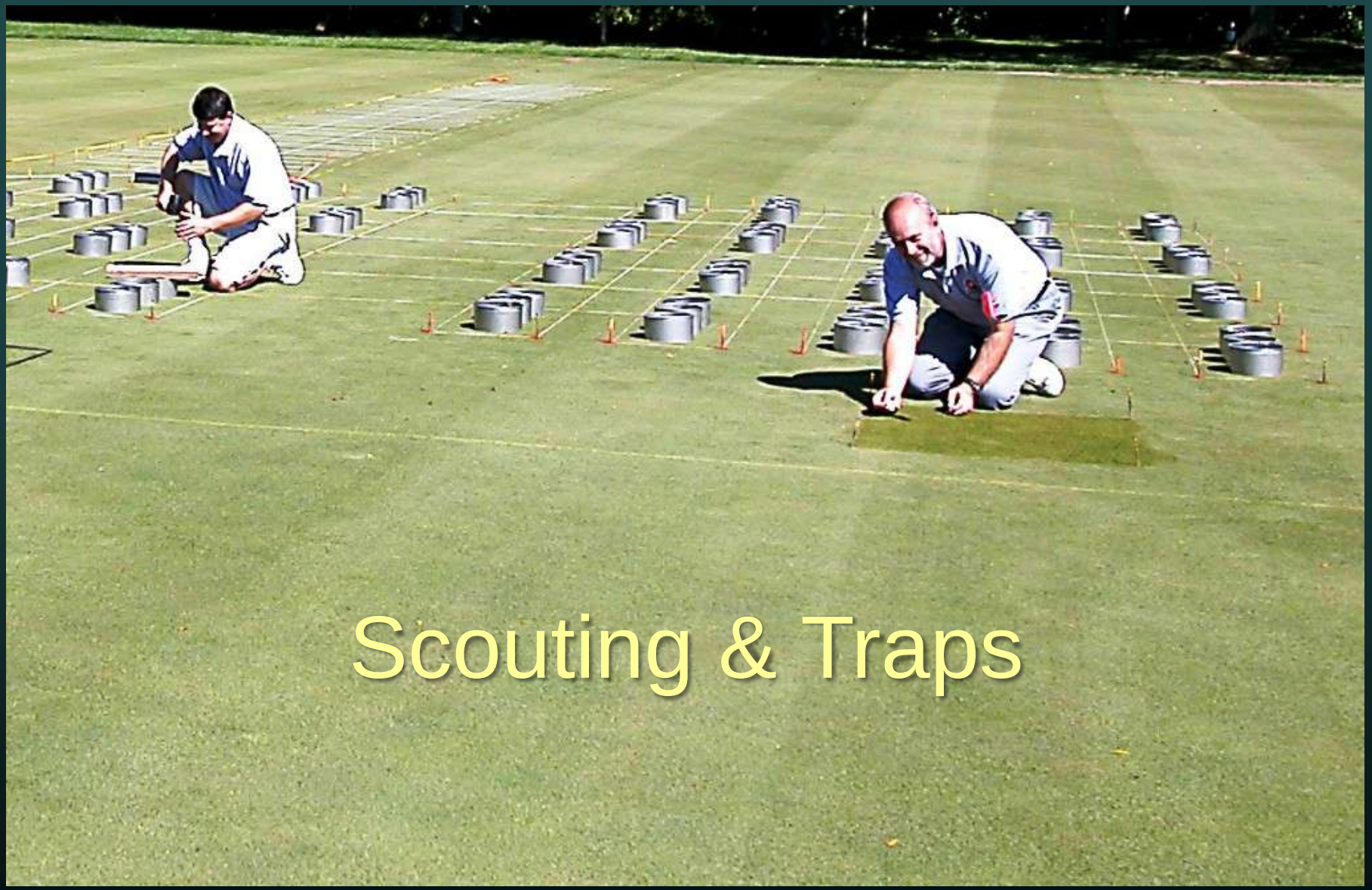
3.1.1 F
tion, refe
3.2 *De*
3.2.1
land or
from pe
by indu

Growing Degree Days

T high + T low divided by 2, minus base T (32 or 50)



Phenology



Scouting & Traps

TURF GOES BROWN FOR MANY REASONS

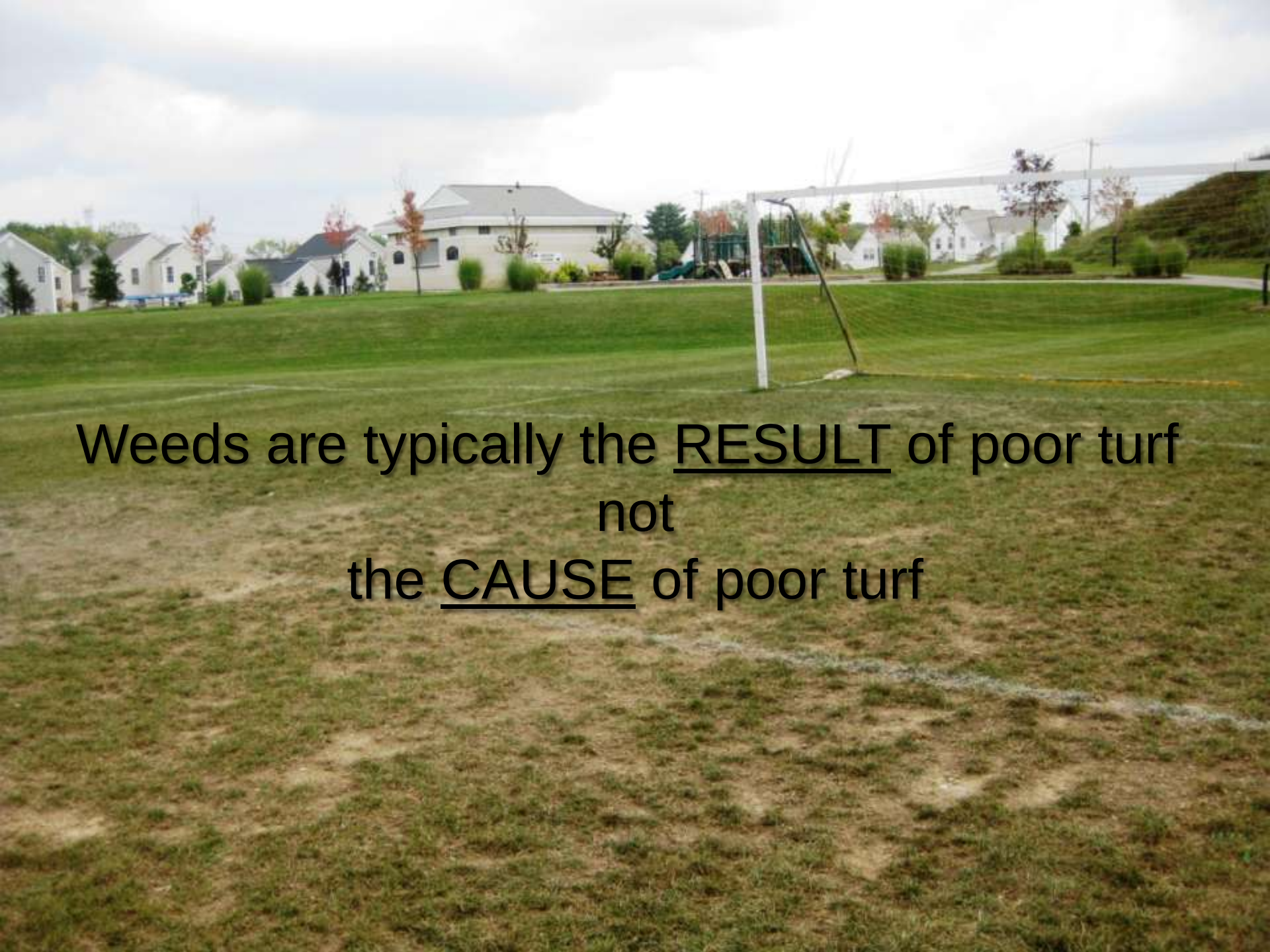
- DISEASE
- PEST
- PHYSIOLOGICAL STRESS
- MAN

How do we tell the difference?

3 Standard Control Strategies

1. Know your enemy!
2. Identify strong & weak points
   - Life cycle (emergence etc.,)
   - Susceptibility to herbicide
3. Use a variety of tactics
   - Cultural control
   - Rotating herbicides
     - Synthetic
     - Natural organic

Weeds


Weeds are typically the RESULT of poor turf
not
the CAUSE of poor turf

Typical Sports Field Weeds

Compacted soils
Knotweed
Clover
Dandelion
Plantains
Crabgrass, goosegrass

Wet fields:
Nutsedge
Poa annua & P. trivialis

Baseball outfields
Creeping bentgrass

Summer Annual Broadleaf Weeds

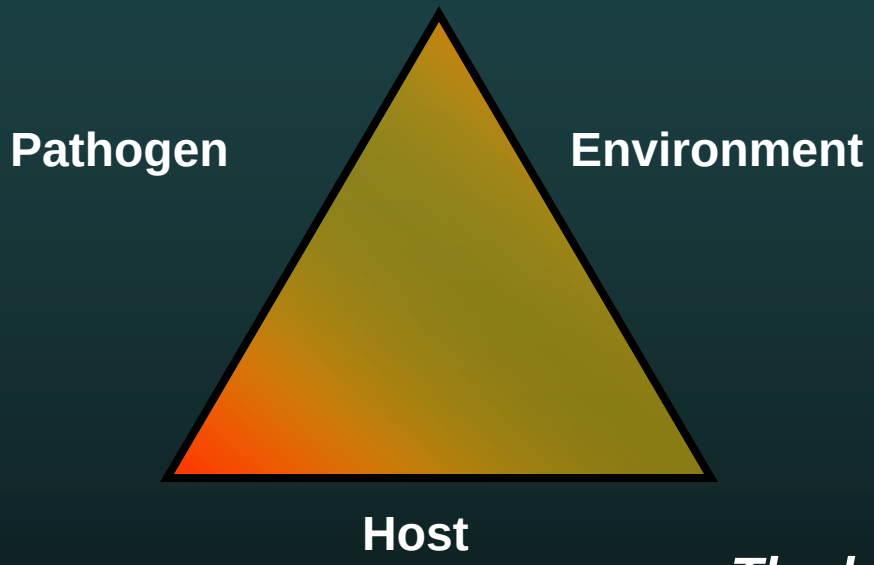
Pigweed - ***Amaranthus blitoides***
(May have reddish stem and taproot)

Purslane - ***Portulaca oleracea***
(Fleshy leaves)

Spurge - ***Euphorbia supina***
(Milky sap distinguishes from knotweed)

Oxalis (Yellow Woodsorrel) - ***Oxalis stricta***
(Heart-shaped leaves)

Understanding Diseases – The Disease Triangle Concept



The host, pathogen & environment must all be present in the right mix to yield disease.

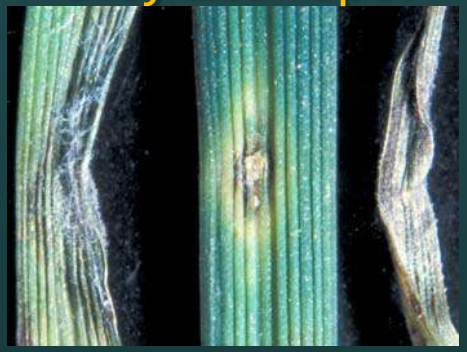
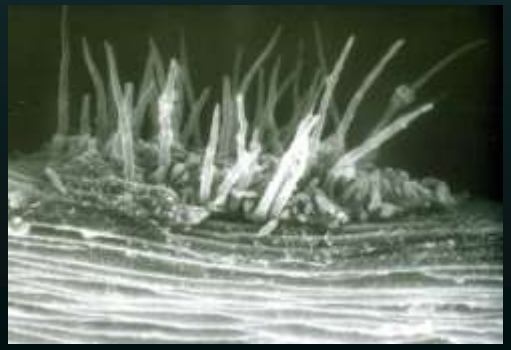
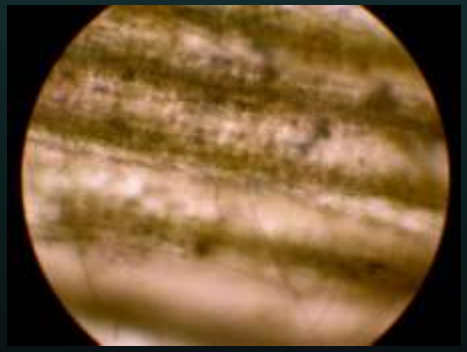
Turfgrass Diseases

- Correctly identify the pathogen
  - Use several ID characteristics
    - Symptoms
    - Signs of damage
    - Weather conditions
    - Turf species affected
    - Field conditions (low lying area, etc.)
  - Lab ID may require weeks!

Differentiating Disease from Other Problem (fertilizer spill etc.)

- Disease *progresses*
- Disease does not grow in straight lines
- Disease apparent on adjacent areas

Identifying Diseases: Signs, Symptoms & Spores

	Anthracnose	Grey Leaf Spot	Brown Patch
Sign			
Symptom			
Spores			

Brown Patch

Dollar Spot

Pythium

Rust

Red Thread

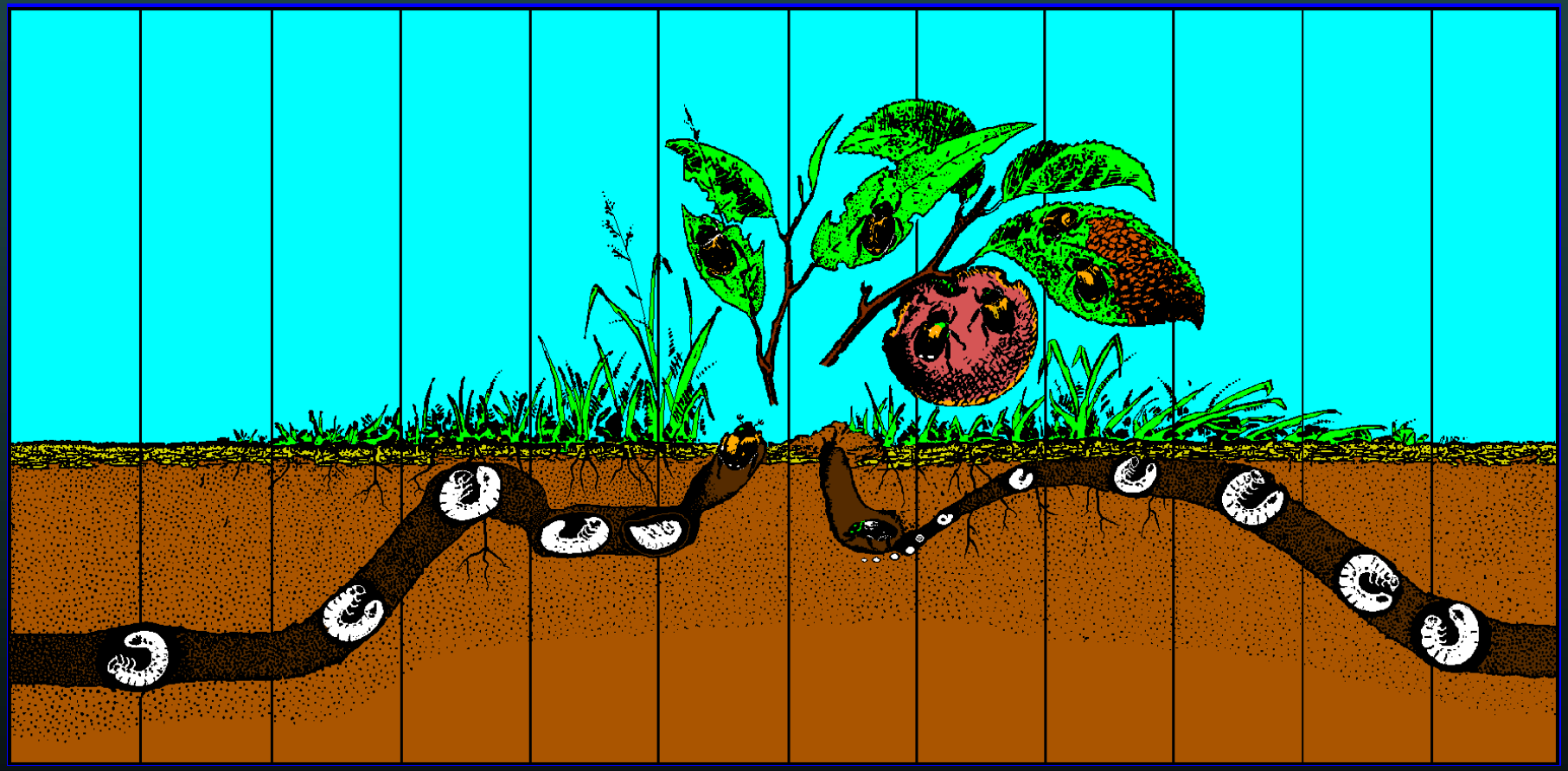
Common Perennial Ryegrass Diseases

Foliar Diseases	
Dollar spot (*Sclerotinia homeocarpa*)	Apply N, remove dew
Gray leaf spot (*Pyricularia grisea*)	Judicious water & N
Gray snow mold (*Typhula species*)	Avoid heavy fall N
Pink patch (*Limonomyces roseipelis*)	Apply N
Pink snow mold/Microdochium patch (*Microdochium nivale*)	Avoid heavy fall N
Red thread (*Laetisaria fuciformis*)	Apply N
Rust (*Puccinia species*)	Apply N
Foliar & Crown Diseases	
Anthracnose (*Colletotrichum graminocola*)	Avoid scalping, avoid XS water
Brown patch (*Rhizoctonia solani*)	Judicious water & N
Leaf spot/melting out (*Bipolaris, Drechslera, and Exserohilum species*)	Judicious water & N
Pythium blight (*Pythium aphanidermatum*)	Judicious water & N
Crown & Root Diseases	
Fairy ring (numerous *Basidiomycetes* fungi)	Apply N, cultivate soil
Seedling disease & damping off (*Pythium, Fusarium, Microcochium and Rhizoctonia species*)	Judicious water & N

Insect Pests

Japanese Beetle Annual Cycle

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC



Where do grubs feed?

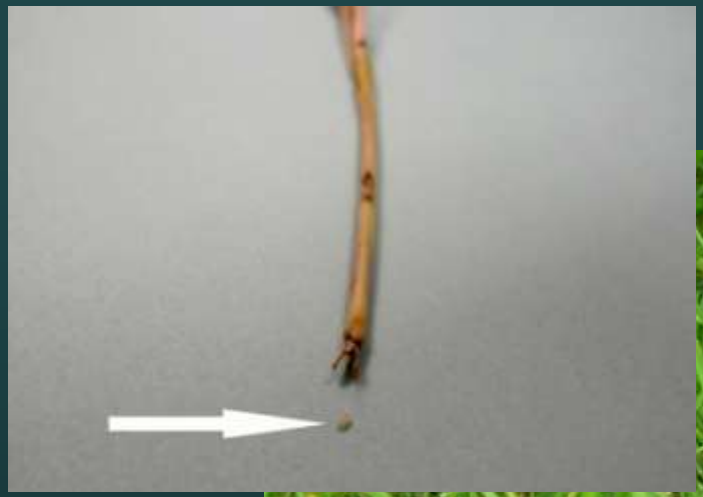
Answer:

Soil-Thatch Interface

Billbug Diagnosis – Use the “tug test”

Turf Problem ID Quiz!

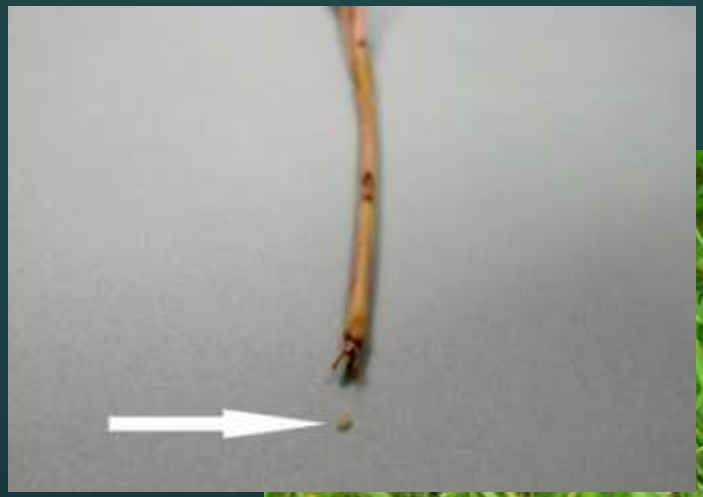
2010 8 15



09/27/2004

28 4:57 PM

Turf Diseases



BuckeyeTurf.osu.edu