# Strategies for Maintaining Turfgrass in Response to "No Pesticide" Legislation

STMA Conference 2013
Victoria Wallace
University of Connecticut
victoria.wallace@uconn.edu

UCONN

In CT, public perception of turf care & pesticide use has directly impacted how municipal & K-8 turf managers address turf care priorities, player safety & field quality.

# Connecticut Lawn Care Pesticide Ban on Child Day Care & School Grounds (P.A. 10-2-31)

- What does the ban cover?
  - All EPA registered pesticides for turf & landscape care
    **(includes synthetic & organic products with EPA registration #)**
  - Day care facilities, & schools grades K-8
  - Effective 7/1/2010
- Are there restrictions under the new law?
  - No restrictions on straight fertilizer products
  - Prohibits combination products
- EPA allowed minimum use pesticides (25b)

  www.epa.gov/oppbppd1/biopesticides/regtools/25b_list.htm
- Only exception- immediate risk of threat to human health

  www.ct.gov/dep/IPM(Select" General Guidance")

Must hold valid pesticide applicator license to apply products
Violators can be fined up to $5000.00; potential prison time

# IPM Law

- Required by Bd. of Educations, and managers/contractors with state property contracts
- Schools-still require IPM plan
  - K-8 properties-(focus cultural practices as first means of care, defines use of 25b products)
  - Exemption Request must be in writing
    - ie: poison ivy.. Seeking emergency exemption with argument children likely to be in location, need to show cultural care effort, 25b use (did or did not work) as part of the "intent" of the law, then show research on product efficacy
- Bd. of Ed. with service contractor-need plan for accountability
- Requires annual review by Bd. of Ed.

# Confusion/Issues

- Shared HS & middle school fields-no pesticides
- Can treat municipal field (next door/across the street) with pesticide, but not school fields
- Parochial school abutting church
- Parochial school/CCD classes in church/temple
- Private school with lower school & upper school
- Daycare on college campus
- Daycare facility away from public school
- K-8 age children use municipal (treated) fields for weekend activities sports
- Some towns, private schools believed ban only on turf, not tree care

# Active Ingredients Exempted Under 25(b) of the Federal Insecticide, Fungicide, & Rodenticide Act

* indicates exempt active ingredients that are also exempt from pesticide residue tolerance requirements

- Castor oil (U.S.P. or equivalent)*
- Cedar oil
- Cinnamon and cinnamon oil*
- Citric acid*
- Citronella and Citronella oil
- Cloves and clove oil*
- Corn gluten meal*
- Corn oil*
- Cottonseed oil*
- Dried Blood
- Eugenol
- Garlic and garlic oil*
- Geraniol*
- Geranium oil
- Lauryl sulfate
- Lemongrass oil
- Linseed oil
- Malic acid
- Mint and mint oil
- Peppermint and peppermint oil*
- 2-Phenethyl propionate (2-phenylethyl propionate)
- Potassium sorbate
- Putrescent whole egg solids
- Rosemary and rosemary oil*
- Sesame (includes ground sesame plant) and sesame oil*
- Sodium chloride (common salt) *
- Sodium lauryl sulfate
- Soybean oil
- Thyme and thyme oil*
- White pepper
- Zinc metal strips (consisting solely of zinc metal and impurities)

- Before the ban, pesticides were most often the “go-to” strategy for eradication rather than examining why a problem occurred


- Economical
- Quick results

# Turfgrass Quality in a Non-Pesticide Environment

- Most K-8 school fields are cared for with a more reduced budget compared to High School fields
  - Reduction in overall expectations, typically not varsity “game day” standards
  - Reduction in turfgrass quality
- Most fields are non-irrigated

# Strategy Implies Plan & Goal

A safe and attractive playing surface should be the focal point in the turf care program

# Implementing a Non-Pesticide Program

- Total re-thinking of the school grounds and athletic field management.
- Attention to cultural practices are now  extremely critical
- Want to maintain healthy turfgrass and avoid potential problems.
  - Must be pro-active
- Overall adjustment in what is acceptable turf quality
  - player safety should define the new standard for acceptable turfgrass (turf cover with weeds ok, if playing surface is uniform)
- Require acceptance of & buy in of stakeholders/user groups

- Strategy 1: Prevent problems, before problem exists
  - Management practices
  - Field Use schedule
- Strategy 2: Allow turf to compete with problem
  - Healthy turf focus-optimize growth
  - Overseeding
- Strategy 3: Eradicate problem/pest
  - Mechanical & cultural removal
  - Alternative acceptable controls

# Communication

- Promotes professionalism, education, & creates opportunity for dialogue
  - Player safety issue
  - Quality of life issue
- Communication is important
  - Maintenance Team
    - First line of defense
  - Administration (AD, business directors, Supt.)
    - Field use & weather
  - User Groups-promotes ownership of issue
    - overbooking

# Field Use

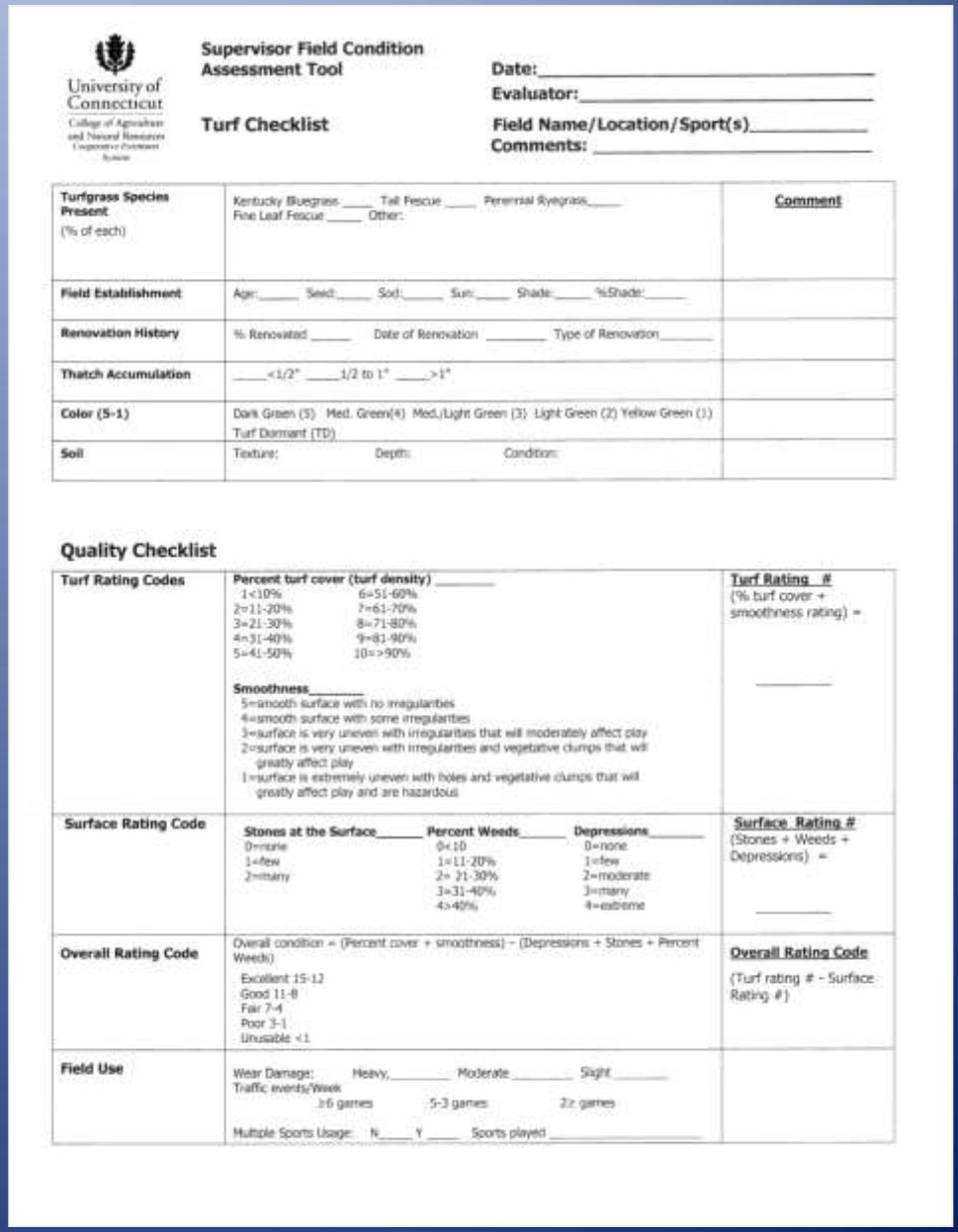
- Limit or withhold use of newly-planted areas until the turf is mature and developed
- Rotate field use to allow recovery/rest of turf
- Schedule minimal activity when field is wet
- Avoid or reduce concentrated foot traffic or wear such as band practice whenever possible
- Allow the turf to recover from winter dormancy before using it in the spring

# Is there a “No budge“ issue in your turf care program??

- Can the “no budge” issue be incorporated into a sustainable program that allows compromise, tolerance & acceptance?

# Tool: Field Assessment Form

- Benefits of: provides quantitative data to support budget needs
  - Need consistent records
- Drawbacks to: some managers fear true evaluation depicts them as having inability to manage turf
  - No baseline before ban



University of Connecticut
College of Agriculture and Natural Resources

**Supervisor Field Condition Assessment Tool**

**Turf Checklist**

**Date:**_____
**Evaluator:**_____
**Field Name/Location/Sport(s)**_____
**Comments:** _____

| | | |
|---|---|---|
| **Turfgrass Species Present** (% of each) | Kentucky Bluegrass ____ Tall Fescue ____ Perennial Ryegrass____ Fine Leaf Fescue ____ Other: | **Comment** |
| **Field Establishment** | Age:_____ Seed:_____ Sod:_____ Sun:_____ Shade:_____ %Shade:_____ | |
| **Renovation History** | % Renovated _____ Date of Renovation _____ Type of Renovation_____ | |
| **Thatch Accumulation** | ____<1/2" ____1/2 to 1" ____>1" | |
| **Color (5-1)** | Dark Green (5) Med. Green(4) Med./Light Green (3) Light Green (2) Yellow Green (1) Turf Dormant (TD) | |
| **Soil** | Texture: Depth: Condition: | |

**Quality Checklist**

| | | |
|---|---|---|
| **Turf Rating Codes** | **Percent turf cover (turf density)** _____<br>1=<10% 6=51-60%<br>2=11-20% 7=61-70%<br>3=21-30% 8=71-80%<br>4=31-40% 9=81-90%<br>5=41-50% 10=>90%<br><br>**Smoothness**_____<br>5=smooth surface with no irregularities<br>4=smooth surface with some irregularities<br>3=surface is very uneven with irregularities that will moderately affect play<br>2=surface is very uneven with irregularities and vegetative clumps that will greatly affect play<br>1=surface is extremely uneven with holes and vegetative clumps that will greatly affect play and are hazardous | **Turf Rating #**<br>(% turf cover + smoothness rating) =<br><br>_____ |
| **Surface Rating Code** | **Stones at the Surface**_____ 0=none 1=few 2=many<br>**Percent Weeds**_____ 0<10 1=11-20% 2= 21-30% 3=31-40% 4>40%<br>**Depressions**_____ 0=none 1=few 2=moderate 3=many 4=extreme | **Surface Rating #**<br>(Stones + Weeds + Depressions) =<br><br>_____ |
| **Overall Rating Code** | Overall condition = (Percent cover + smoothness) - (Depressions + Stones + Percent Weeds)<br>Excellent 15-12<br>Good 11-8<br>Fair 7-4<br>Poor 3-1<br>Unusable <1 | **Overall Rating Code**<br>(Turf rating # - Surface Rating #) |
| **Field Use** | Wear Damage: Heavy,_____ Moderate _____ Slight _____<br>Traffic events/Week<br>≥6 games 5-3 games 2≥ games<br>Multiple Sports Usage: N____ Y ____ Sports played _____ | |

## I. Fertility/Nutrient Management

| Date of Application/Location All or part of field | Product | Rate (1 lb/fert/ 1000 sq.ft) | Fert Analysis N P K (46-0-0) | Compost Analysis (1/4" compost@ dry weight basis is approx. 750#/1,000 sq.ft) | Biostimulant (Y/N, type) |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Annual Total | | | | | |

## II. Other-Cultural Management

| | | Comments |
|---|---|---|
| **Mowing Practices** | Frequency_____<br>Height of Cut_____ Blade Sharpen Frequency_____<br>Rotary _____ Reel _____<br>Make/Model of Equipment _____<br>Collection of Clippings: No_____Yes_____<br>If yes why _____ | |
| **Irrigation** | Irrigation : Y / N<br>Frequency_____ Rate_____Water source_____ | |
| **Cultivation** | Type: Hollow _____ Solid _____ Slice _____<br>Frequency_____ | |
| **Topdressing** | Frequency_____ Rate _____<br>Material Composition_____ | |
| **Overseeding** | Frequency_____ Rate_____Date_____<br>Mixture/Blend Formula _____ Pre-Germ Y N<br>Species_____<br>(Varieties, if known) | |
| **Soil Test** | Date:_____ Action Taken:_____ | |

## III. Pest Management

| | | | | |
|---|---|---|---|---|
| **Broadleaf Weeds** (% coverage /1,000sq.ft) | ____Dandelion<br>____N L Plantain<br>____Broad Leaf Plantain<br>____Heal-all<br>____Common Chickweed | ____Oxalis<br>____Spurge<br>____Knotweed<br>____Ground Ivy<br>____Violet | ____M. ear chickweed<br>____Clover (white)<br>____Speed well | **Control/Trtment / Date of Action:** |
| **Grassy Weeds** (% coverage/1,000sq.ft) | ____Crabgrass<br>____Poa annua<br>____Quackgrass | ____Goosegrass<br>____Poa trivialis<br>____Bentgrass<br>____Tall Fescue | ____Yellow Nutsedge<br>____Orchardgrass<br>____Other | |
| **Insects** | Grubs (avg. # /1,000 sq.ft )____ Sod webworm ____ Chinch bug____<br>Grub type _____ Bl. Billbug _____<br>Other_____ | | | |
| **Disease** | Affected Species:_____ %Area of Turf Infected_____ Disease_____ | | | |
| | Affected Species:_____ %Area of Turf Infected_____ Disease_____ | | | |
| | Affected Species: _____ %Area Turf Infected _____ Disease_____ | | | |

Field ID:_____

**Landscape Diagram (Use Additional Sheet if Necessary)**

Comments:

# Cultural Practices

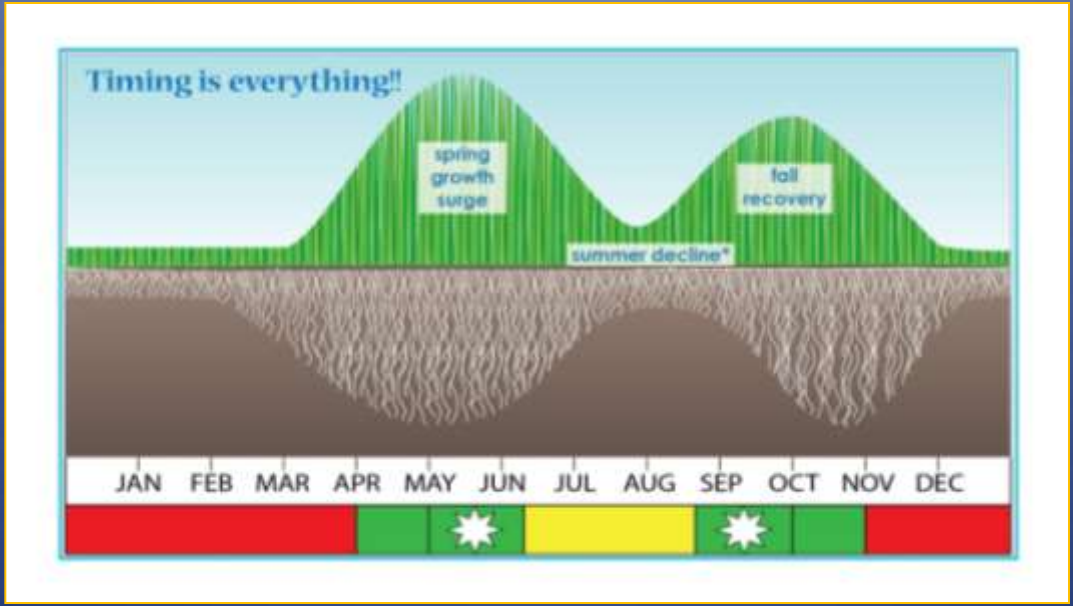
- Mowing
- Fertilization
- Irrigation & Water Conservation
- Thatch Control/Cultivation
- Overseeding & Turf Selection
- Pest Control

# Mowing

- "Mow" as a Strategy
  - Repeated action directly affects turfgrass plant
  - Greatly under-estimated how mowing affects management program
  - Important in weed ecology
  - Mowing height & frequency
    - Ideal HOC for all turfgrasses
    - Raise HOC, reduce mowing frequency
- Not all fields need low HOC
- Consistent HOC most important

# Mowing-Timing

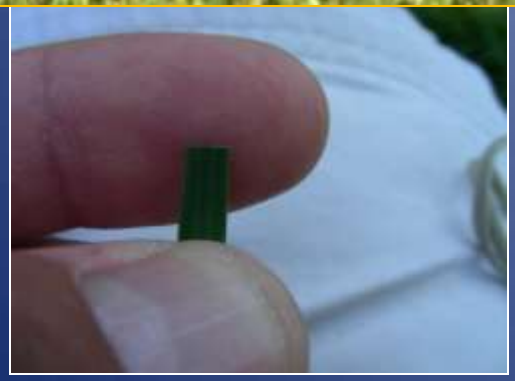
- Frequency of mowing can change with seasons
  - Spring & Fall-more aggressive mowing schedule
  - Summer-reduced growth rate, less mowing



# Scalping

- Removes excess shoots & leaves
- Stops/ interrupts growth
- Increases weed and disease problems
- Visually unattractive

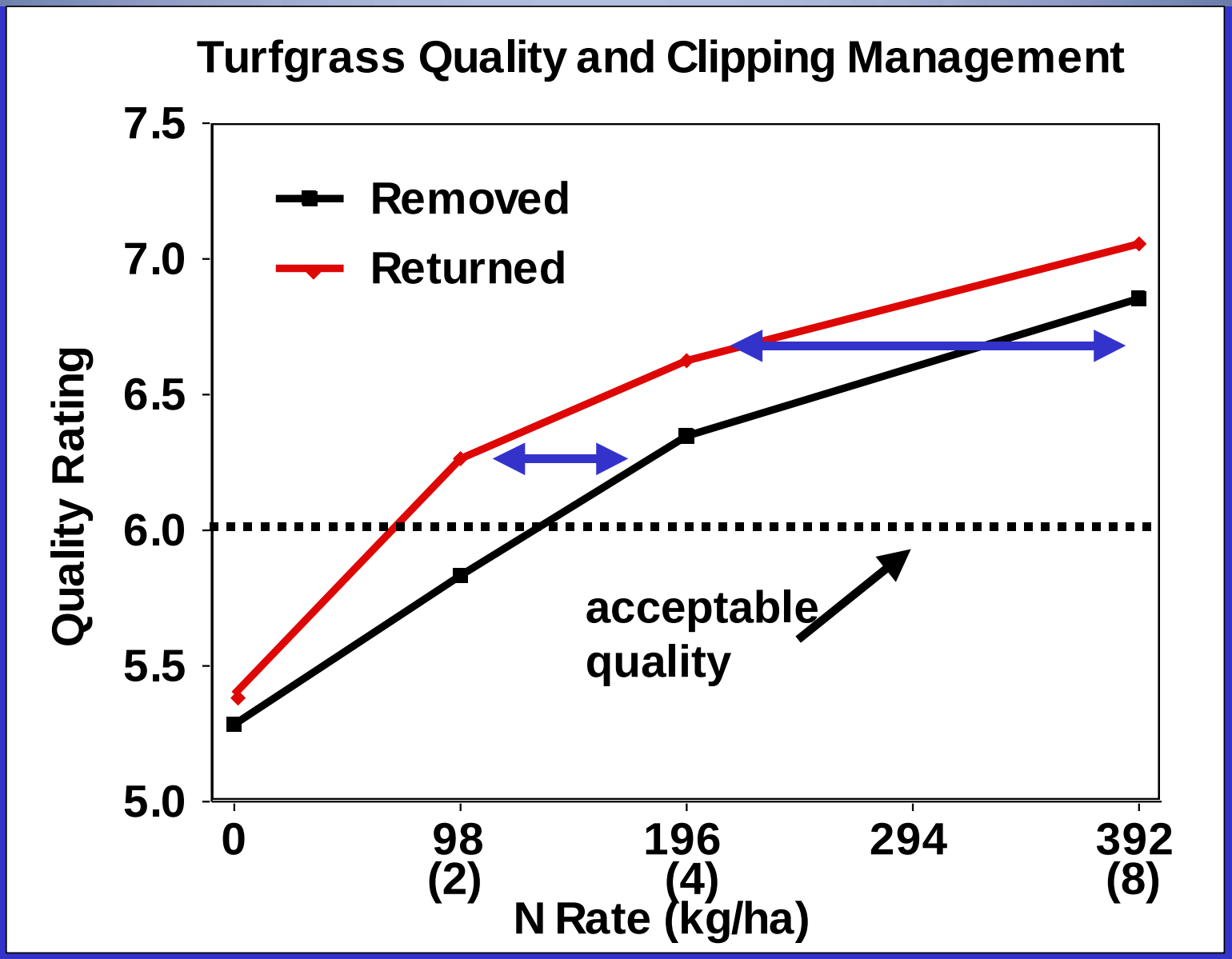
# Its all in the details…



Keep mower blades sharp

Wear & Mowing pattern

# Clipping Practices




Kopp and Guillard (2001)

# Nitrogen: Critical in a turfgrass fertilization program

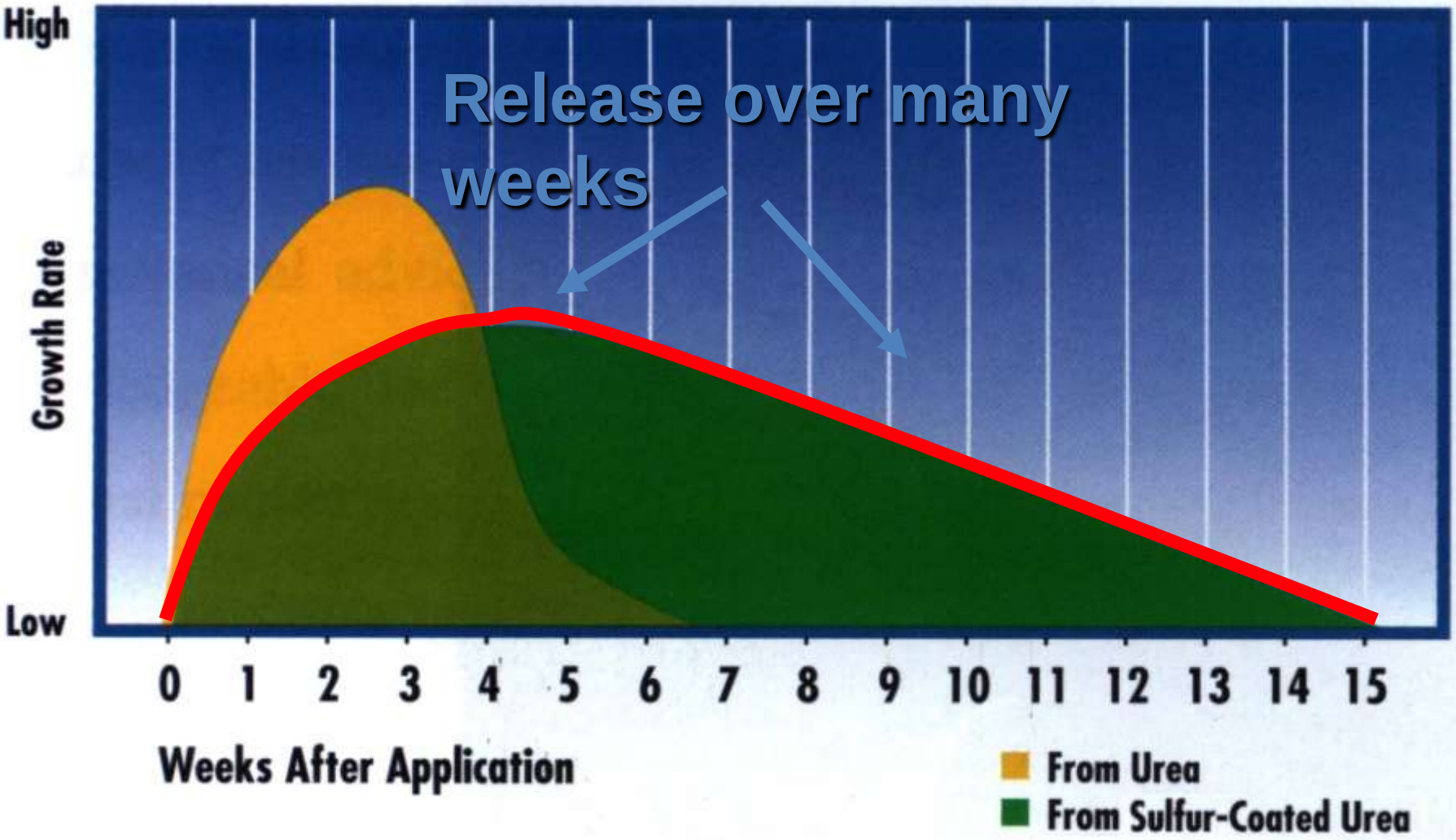
- Promotes shoot growth
- Promotes color
- Traffic tolerance & recovery from injury
- Effects disease/weed occurrence & recovery
- Advantages to both quick & slow release products

# Fertility program: Key focus of a "no pesticide" strategy

- Fertilize/provide nutrients for optimal turf growth
- Fertility program should be in concert with mowing frequency & activity to support recovery

- Start with a soil test

# TYPICAL GROWTH RESPONSE



# Fertility in a "No Pesticide" Program

- Plants can not differentiate between food source
- Synthetic or organic products
- Each has advantages or disadvantages

<u>Synthetic</u>

% N: high

Cost/bag: high

Cost/unit N: variable

Very Consistent-

Guaranteed analysis

Inert ingredients known)

Can use all season, not dependent on soil temperature

<u>Organic</u>

% N: low

Cost/bag: variable

Cost/unit N: high

Consistency- dependent on product

Results dependent on soil temperature & microbial activity

# Organics & Turf

- N most critical of nutrients
- In sports turf care, esp. high wear fields, often not enough N in organic products for optimal turf growth at times when turf needs available N
- Phosphorus- can end up over-applying
  - city compost products, unwanted ingredients (H. metals)
- O2 through aeration/cultivation practices
- C:N ratio
  - Too much C can make N unavailable
- Application concerns
  - Inconsistent in composition, odor

# Corn Gluten Meal

- Labeled for control of crabgrass

  -has some pre-emergence herbicidal activity
- By-product of milling process of corn grain used for animal feed
- High N content 9-10%, and N content needs to be calculated into management plan
- Required 2 applications as recommended by manufacturer for correct control of crabgrass
- Requires @ 10-20 lbs/ CGM/1,000 sq.ft./year….excessive amounts of N applied.

# Phosphorus Ban

## Effective January 1, 2013

The new law prohibits fertilizer applications containing phosphorus to established lawns except when soil test (previous 2 years) indicates the soil is lacking in phosphorus and fertilizer, soil amendments or compost containing phosphate and is needed for the growth of such lawn.

The new law will allow phosphate fertilizer for establishing new grass or repairing such lawn with seed or sod.

Any fertilizer, compost or soil amendment that contains 0.67% or less phosphate can be applied without a soil test.

---

## No fertilizers applied: December 1-March 15

## Fertilizer application banned 20 feet from water body

(includes: brook, stream, river, pond, lake, LI Sound, & other water body)

# Compost

- As topdressing in turf maintenance programs and in landscape plantings

# Determining the Importance of Leaf Compost Topdressing and Core Cultivation when managing Athletic Fields Organically

Brian J. Tencza and Jason J. Henderson
Department of Plant Science and Landscape Architecture
University of Connecticut

UCONN

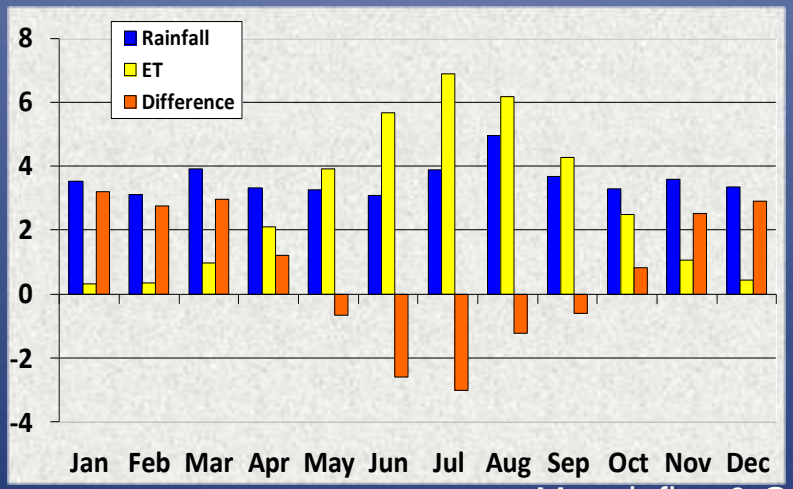
# Compost Topdressing

- Increase in cover after wear
- Decreased soil bulk density
- Increased water retention
- Decreased surface hardness
- But……P content can be a problem
  - Applied at ¼ inch
  - Leaf (0.1%)  0.4 lbs $P_2O_5$/M
  - Dairy (1.0%)  4.0 lbs $P_2O_5$/M
  - Poultry (2.0%)  8.0 lbs $P_2O_5$/M

J. Henderson

# Fall Fertilization-New Considerations

- CT-LI Sound-Water Pollution Great Concern
  - Political reality: compromise on both sides needed
- In Fall, leaching potential greatest and water uptake by grass plant marginal
- Limited agronomic benefits and higher water quality risks associated with late fall fertilization
- *Earlier date of fall application – higher ET in Sept. and Oct. – will allow for more N uptake than Nov. and Dec.*




Mangiafico & Guillard

# Irrigation

- Water wisely-
  - Focus on maintaining optimal turf health
  - Deep & infrequent watering(1-1.5”/week)
  - Know infiltration rates of each field
- Important in plant growth, so if do not want to encourage plant growth-don’t irrigate
  - impacts thatch development
  - Impacts disease, insect & weed populations
- Incorporate weather and ET data into irrigation scheduling

  -- use irrigation as a part of strategy
- Irrigation rates dependent on many factors (soil, temp., humidity, turf species, mowing practices, field use etc)

# Water Conservation & Irrigation Management

- Water Audit-as part of management strategy
  - increases awareness of irrigation system efficiency
  - sets a goal for water reduction

# Overwatering leads to greater turf loss than drought stress

Avoid Overwatering:

- Compaction, Oxygen deficit
- Leaching of nutrients
- Disease, weeds
- Short root systems
- Thin and weak turf

# Cultivation

- Reduce compaction
  - Aeration
  - Vertical mowing
  - Topdressing
- Manage thatch
- Opens spaces in soil, allows oxygen exchange
- Enhance water infiltration
- Improve root growth
- Provides ideal environment for seed germination

# Cultural Practices and Grub Control

- Aerfication-rumblings that helps with grub eradication
- Needs to be 1 or 2 instar, typically too small to notice damage.
- Consistent, proactive aerification schedule early fall may keep grub populations in check

# Aeration/Cultivation


A. McNeal

- Cultivation: frequent
  - Should be done at least 5X/season
  - Lesser used areas/fields: may only need aerating 1 or 2X/month.
  - Heavy use areas: as often as can be accomplished based on field use schedule

# Weed Management

- Prevention:  Manage for “Healthy turf”
- Cultural practices-encourage turf growth & reduce open spaces where weeds can establish
  - Correct turfgrass selection
  - Correct establishment practices
  - Optimal fertility & pH
  - Mowing-no scalping
  - Irrigation

# Weed Management

- Excessive wear over short time=reduced turf cover and increased weed pressure
- Need to understand weed biology
- Eradicate/reduce populations by choice of options: competition with overseeding, mechanical, topdressing, chemical

# What has been observed since the 2010 pesticide ban?

- Weeds: #1 complaint
- Those that are not pro-active have a hard time "catching up" with field care

Requires:
Additional
Budget for Labor

# Overseeding

- HUGE benefit in managing sports turf; especially in non-pesticide programs

# Overseeding

- Maintains turf density
- Reduces weed populations
- Provides soil stability (good root system)
- Provides uniformity of turf surface-supports player safety, provides stability of footing

# Recommended Over-seeding Practices

- Reduce weeds from establishment . Buy quality seed and improved varieties… *you get what you pay for!*
- Research at UCONN, Ohio State, Iowa State, Guelph, Cornell demonstrates that overseeding at high rates reduce weed populations on athletic fields.

# The Effect of Overseeding on Broadleaf Weed Populations

## No Fertility or Pesticides

**June 22, 2009**


**Overseeded**


**Not Overseeded**

J. Henderson

# Overseeding, Weed Management & Traffic

- In a turf program with non-pesticide focus, seed to compete/crowd out weed populations
- Overseeding should be a standard practice of a weed control program.
  - 20-45#/1,000#/yr
- Not just spring & fall focus
  - Seed all season long, including summer
  - Never know when conditions will be favorable for germination

# Overseeding Programs

- Perennial Ryegrass-most popular in choice
  - Significant differences between heavily overseeded and lightly overseeded fields
  - Endophytic potential
  - Allellopathic effects
- Transitional Ryegrass
  - Serves as nursegrass
  - Germinates and establishes in soil temps 35-40 degrees
  - Extends overseeding season; provides turf cover in colder northern climates-critical with late fall sports and early in spring season

J. Rector

# Quick Germination/Improved Seedling Vigor

Quick establishment =less weeds

# Surface Insect Management: Endophytes

Endophyte-enhanced seed for surface-feeding insects

Deters/kills surface feeding of insects-need at least 50% endophytic seed in mix/blend to have some effect

# The “New” Tall Fescue Varieties

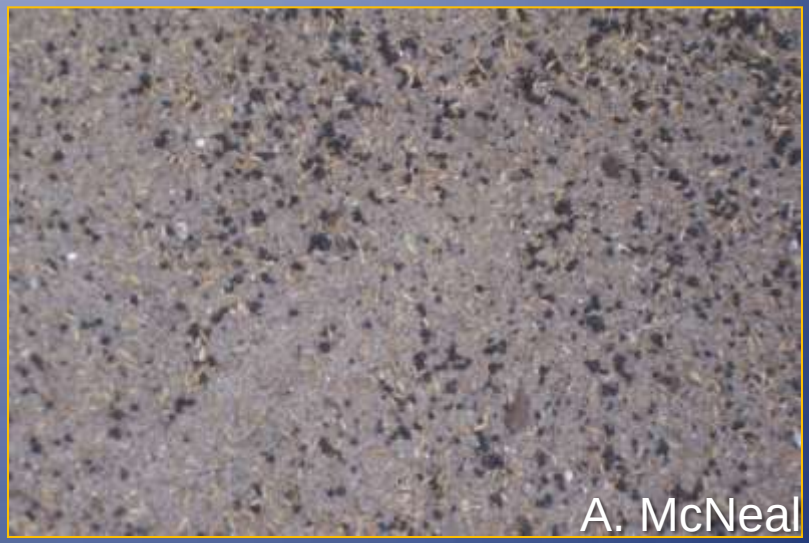
- Improved, finer turf texture
- Improved density, lower HOC tolerance, finer leaf blade
- Improved drought tolerance
- Improved disease tolerance (BP, Gray Leaf spot)
- Rhizomes- in some varieties, both early spring and later in fall (not as aggressive as KB)
- Re-purposed in athletic field programs

# Kentucky bluegrass qualities-desired in athletic turf programs

- Strong seedling vigor
- Extreme season performance: Early spring green up & fall color retention
- Medium-dark green color
- Strong wear tolerance
- High density & strong lateral growth
- Strong disease resistance
- Heat and drought tolerance
- Improved shade performance

# Pre-Germination

- Buy good quality seed
- Soak seed in water, 24-48 hrs avg.(oxygenated preferred) water changed at least every 24 hrs. (drain & re-fill to remove “bad” water)
- Drain, spread out, dry & rake till workable
- Prepare divot mix roughly 1:1 ratio (sand, fertilizer, cal. clay)
- Spread-broadcast, spreader



# When all else fails….

- Sod it!!
- Incorporate sod repair or new installation into a strategic budget
- Start with clean slate if/when weeds become the majority of stand


# Mechanical Removal

- Hand Rouging
- Hot & Cold
- Mowing

# Alternative Chemical Control Practices

- Organic herbicide products-CGM, Acetic Acid, Clove Oil, etc. (25b products)
  - –Contact,
  - –Post-emergent
  - –Non-selective


# Minimum Risk Pesticide (25b) Pesticide Evaluation





# Insect Management-Grubs

# Nematodes

- No EPA registration required
- Need to get into soil below thatch
- Nematodes shipped overnight & immediately refrigerate upon arrival
- pre-soak/irrigate turf area prior to application
- Apply at dusk and irrigate treated areas
- Observe curled-up grubs within a few days


G.Foran

# Field Use

- Limit or withhold use of newly-planted areas until the turf is mature and developed
- Rotate field use to allow recovery/rest of turf
- Schedule minimal activity when field is wet
- Avoid or reduce concentrated foot traffic or wear such as band practice whenever possible
- Allow the turf to recover from winter dormancy before using it in the spring

# Budget for Renovation/Recuperation of Field

- Aim for extreme: Re-sodding or extensive overseeding with adequate maturation time.
- Develop one “showcase” field that draws attention away from problem fields. Document inputs/resources needed to develop such a field (preferably a field with minimal-moderate traffic)
- Document with field assessment data & photographs

# Does a "No Pesticide" Program Cost More?

- Yes.....more labor with management practices and increased cost for alternative practices.
  - Client needs to understand.
  - Need to determine how to re-capture the added expense, some initial expenses off-set decrease of inputs
- Changes in Field Usage to maintain turf at standard acceptable for player safety
- End Goal: Healthy Turf & Grounds, Realistic Expectations, & Supportive Town Residents

# Continuing Education

- Update & Learn
- Gather Information
  - Attend Conferences, Field Days
  - NTEP, CTBT, STMA, extension researchers, vendors
- Seek advice
- Look at both sides of a position
  - Science-based data
  - Need to appreciate all sides of an issue to develop best strategy of control
- Be aware of all available tools

# Yes, we can successfully manage turf without pesticides!

# A Survey of School Grounds Pest Management Practices

Thank you for generously participating on *A Survey of School Grounds Pest Management Practices.* You are helping educators, school grounds maintainers, decision makers, practitioners and others understand the challenges you face in your position. If you are responsible for maintaining school grounds please take the time to fill out the below survey and return it to us at your earliest possible convenience. Please answer all 36 questions to the best of your ability.

Your responses will be confidential and combined with other returned survey information. The information will be shared with you and others when published.

The purpose of this survey is to collect information about how school grounds have been maintained in the past and how they are currently managed. We would also like to learn, generally, how the pesticide ban on K-8 school grounds has impacted the quality of school grounds in terms of aesthetics, labor, and budget.

**If you are not the person responsible for maintaining school grounds,** please forward this survey to the appropriate person or return the survey to us with the name and department/address of the person who is making these decisions. You may also email: Victoria.wallace@UConn.edu or call 860-885-2826 and leave a message with the correct contact information. Thank you very much for your support and participation.

## QUESTIONS

Your Town_____ Your Name_____

1. What town department do you work for? _____
2. Are you responsible for making pest management decisions on school grounds? Yes No
3. If yes, what is your title and department? _____
4. If no, who is? Name, title and department?_____
5. Are you responsible for making purchasing decisions for school grounds maintenance? Yes No
   If not who is? Name and title and department_____
6. How long have you worked in your current position? _____
7. What is your educational background?

_____High School
_____2 year degree, field of study_____
_____4 year degree, field of study_____
_____Other_____

8. How do you keep current with athletic field/turf grass, tree and shrub management practices?

Rank in order of most frequent, 1 being most frequent.

_____Winter workshops
_____Pesticide training/certification
_____Association meetings & certification programs
_____Other_____
_____Vendor support & seminars
_____Trade shows

Thank you!