Strategies for Maintaining Turfgrass in Response to “No Pesticide” Legislation

STMA Conference 2013
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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
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
### I. Fertility/Nutrient Management

<table>
<thead>
<tr>
<th>Date of Application/Location</th>
<th>Product</th>
<th>Rate (1 lb/1,000 sq ft)</th>
<th>Fert Analysis N P K (4-0-0)</th>
<th>Compost Analysis (1.5” compost) dry weight basis is approx. 750 lb/1,000 sq ft</th>
<th>Biostimulant (Y/N, type)</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Annual Total</td>
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</tbody>
</table>

### II. Other-Cultural Management

<table>
<thead>
<tr>
<th>Mowing Practices</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency ______</td>
<td></td>
</tr>
<tr>
<td>Height of Cut</td>
<td></td>
</tr>
<tr>
<td>Blade Sharpen Frequency</td>
<td></td>
</tr>
<tr>
<td>Rotary ______</td>
<td></td>
</tr>
<tr>
<td>Reel ______</td>
<td></td>
</tr>
<tr>
<td>Mower/Model of Equipment</td>
<td></td>
</tr>
<tr>
<td>Collection of Clippings: No ______ Yes ______</td>
<td></td>
</tr>
<tr>
<td>If yes why ______</td>
<td></td>
</tr>
<tr>
<td>Irrigation</td>
<td></td>
</tr>
<tr>
<td>Irrigation: Y/N</td>
<td></td>
</tr>
<tr>
<td>Frequency ______</td>
<td></td>
</tr>
<tr>
<td>Rate ______</td>
<td></td>
</tr>
<tr>
<td>Water source ______</td>
<td></td>
</tr>
<tr>
<td>Cultivation</td>
<td></td>
</tr>
<tr>
<td>Type: Hollow ______ Solid ______ Sickle ______</td>
<td></td>
</tr>
<tr>
<td>Frequency ______</td>
<td></td>
</tr>
<tr>
<td>Topdressing</td>
<td></td>
</tr>
<tr>
<td>Frequency ______</td>
<td></td>
</tr>
<tr>
<td>Rate ______</td>
<td></td>
</tr>
<tr>
<td>Material Composition</td>
<td></td>
</tr>
<tr>
<td>Overseeding</td>
<td></td>
</tr>
<tr>
<td>Frequency ______</td>
<td></td>
</tr>
<tr>
<td>Rate ______</td>
<td></td>
</tr>
<tr>
<td>Date ______</td>
<td></td>
</tr>
<tr>
<td>Variety ______</td>
<td></td>
</tr>
<tr>
<td>Species ______</td>
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</tr>
<tr>
<td>Soil Test</td>
<td></td>
</tr>
<tr>
<td>Date ______</td>
<td></td>
</tr>
<tr>
<td>Action Taken ______</td>
<td></td>
</tr>
</tbody>
</table>

### III. Pest Management

<table>
<thead>
<tr>
<th>Broadleaf Weeds</th>
<th>Control/Treatment / Date of Action:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadleaf</td>
<td>Dandelion</td>
</tr>
<tr>
<td>Broad Leaf</td>
<td>N L Plantain</td>
</tr>
<tr>
<td>Broad Leaf</td>
<td>Broad Leaf Plantain</td>
</tr>
<tr>
<td>Common Chickweed</td>
<td>Ground Ivy</td>
</tr>
<tr>
<td>Common Chickweed</td>
<td>Violet</td>
</tr>
<tr>
<td>Common Chickweed</td>
<td>Speed well</td>
</tr>
<tr>
<td>Grass Weeds</td>
<td>Crabgrass</td>
</tr>
<tr>
<td>Grass Weeds</td>
<td>Poa annua</td>
</tr>
<tr>
<td>Grass Weeds</td>
<td>Quackgrass</td>
</tr>
<tr>
<td>Grass Weeds</td>
<td>Goosegrass</td>
</tr>
<tr>
<td>Grass Weeds</td>
<td>Poa trivialis</td>
</tr>
<tr>
<td>Grass Weeds</td>
<td>Bentgrass</td>
</tr>
<tr>
<td>Grass Weeds</td>
<td>Tall Fescue</td>
</tr>
<tr>
<td>Grass Weeds</td>
<td>Yellow Nutsedge</td>
</tr>
<tr>
<td>Grass Weeds</td>
<td>Orchardgrass</td>
</tr>
<tr>
<td>Insects</td>
<td>Grubs (avg. # /1,000 sq ft)</td>
</tr>
<tr>
<td>Insects</td>
<td>Sod webworm</td>
</tr>
<tr>
<td>Insects</td>
<td>Chinch Bug</td>
</tr>
<tr>
<td>Disease</td>
<td>Affected Species ______ % Area of Turf Infected ______ Disease ______</td>
</tr>
<tr>
<td>Disease</td>
<td>Affected Species ______ % Area of Turf Infected ______ Disease ______</td>
</tr>
<tr>
<td>Disease</td>
<td>Affected Species ______ % Area of Turf Infected ______ Disease ______</td>
</tr>
</tbody>
</table>

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...

Wear & Mowing pattern

Keep mower blades sharp
Turfgrass Quality and Clipping Management

- Removed
- Returned

Quality Rating

N Rate (kg/ha)

acceptable quality

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

Release over many weeks

Weeks After Application

- From Urea
- From Sulfur-Coated Urea
Fertility in a “No Pesticide” Program

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

<table>
<thead>
<tr>
<th>Synthetic</th>
<th>Organic</th>
</tr>
</thead>
<tbody>
<tr>
<td>% N: high</td>
<td>% N: low</td>
</tr>
<tr>
<td>Cost/bag: high</td>
<td>Cost/bag: variable</td>
</tr>
<tr>
<td>Cost/unit N: variable</td>
<td>Cost/unit N: high</td>
</tr>
<tr>
<td>Very Consistent- Guaranteed analysis</td>
<td>Consistency- dependent on product</td>
</tr>
<tr>
<td>Inert ingredients known)</td>
<td>Results dependent on soil temperature &amp; microbial activity</td>
</tr>
<tr>
<td>Can use all season, not dependent on soil temperature</td>
<td></td>
</tr>
</tbody>
</table>
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.
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.

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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
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\textsubscript{2}O\textsubscript{5}/M
  - Dairy (1.0%) 4.0 lbs P\textsubscript{2}O\textsubscript{5}/M
  - Poultry (2.0%) 8.0 lbs P\textsubscript{2}O\textsubscript{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.
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
• 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: 38 Weeds

Not Overseeded: 61 Weeds

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
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

A. McNeal
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

48 hrs

7 day

14 day

21 days

30 days
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
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
   _____ Vendor support & seminars
   _____ Trade shows
   _____ Other
Thank you!