


Growing A Great Lawn
(Updated April 2019)


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What are turfgrasses and where do we grow them?

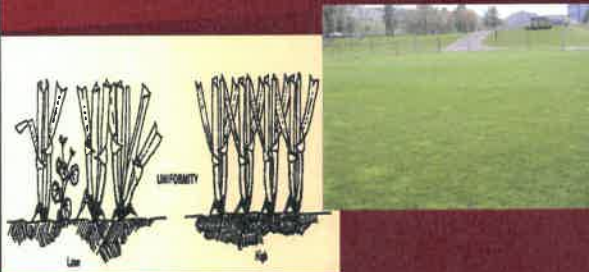






What are your goals?

TURF QUALITY



Quality is a function of color & density

Take note of patterns



Site Evaluation

- Use of the area
- Sun or shade
- Soil type
- Irrigation
- Expected maintenance level
- Quality expectations



Just what size is your lawn?

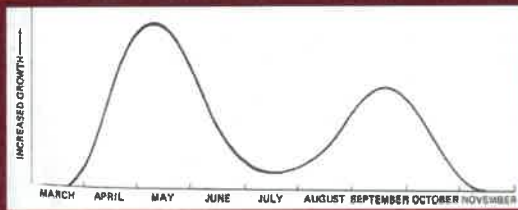


What Lawn Grasses Do We Grow?

- All are cool season grasses
- Kentucky Bluegrass
- Perennial Ryegrass
- Fine Fescues
- Tall Fescues



Typical Kentucky Bluegrass growth cycle



Optimum Root Growth 55-62 degrees F

Optimum Shoot Growth 60-75 degrees F

Kentucky Bluegrass



- Rhizomes - spreads and recuperates well
- Good color, medium to fine texture
- Very attractive
- Tolerates many conditions
- Likes good fertility
- Long germination time

Perennial Ryegrass

- Bunch type grass
- Medium texture and color
- Likes sunny conditions best
- Does not tolerate drought well
- Some have endophytes
- Rapid germination and establishment
- Good for quick fixes



Fine Fescues



- Include chewings fescue, creeping red fescue, hard fescue, sheep fescue
- Very fine texture, wear intolerant
- Takes poor soil, low fertility, sun or shade
- Slow growth, less clippings
- Low maint. lawns

"Low Mow" Fescue


- Planted at our Demonstration Garden August 21, 2006
- Prairie Nursery, Westfield, Wisconsin (prairienursery.com)
- 24.50% 'SR5100' Chewing fescue
- 24.50% 'Azay' sheep fescue
- 12.25% 'SR3100' hard fescue
- 12.25% 'Scaldis' hard fescue
- 12.25% creeping red fescue
- 12.25% 'Dawson' red fescue








Tall Fescue



- Was/is a weed
- Coarser texture
- Tolerates drought, poor soil, and lower fertility
- Full sun to light shade
- Does not play well with other grasses
- Mod. germ. time
- Avoid "Kentucky 31"


Blends & Mixes

	Sunny, medium to high maintenance	
	65% Kentucky bluegrass blend 15% perennial ryegrasses 20% fine fescues	3 to 4 lbs. per 1,000 sq. ft.
	Sunny, low maintenance	
65% fine fescue blend 15% perennial ryegrasses 20% Kentucky bluegrass blend or 100% tall fescue blend	4 to 5 lbs. per 1,000 sq. ft. 7 to 10 lbs. per 1,000 sq. ft.	
Shady		
100% fine fescue blend	4 to 5 lbs. per 1,000 sq. ft.	



Aids to germination

- Water, water, water
- Starter Fertilizer

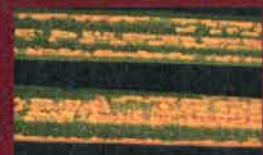


Aids to germination

- Straw mulch
- Paper mulch
- Germination mat



Some problems like rust and chinch bugs can be avoided by buying resistant seed



- Surface-feeding insects such as chinch bug can be discouraged by using "endophyte-enhanced" grasses
- Many grasses have been bred for disease resistance

Trebro Sod Harvester at Saratoga Sod Farm, Rensselaer County, NY



Installation...



What can go wrong?

- Poor soil/site preparation
- Watering – too much or too little
- Wrong site for sod type
- Wrong site for turfgrass



Think twice before planting:

- Annual ryegrass
- Zoysiagrass

Annual ryegrass

- What word in this plant's name provides a clue this would not be a good lawn grass?



Zoysiagrass



What about white clover?



- Once common in seed blends
- Potential for bee stings, grass stains and poor footing
- Drought tolerant. N fixing
- Used 2 lbs. seed per acre or 0.05 lbs. Per 1000 sq. ft.

Do we have to have lawns everywhere?



Maintaining a Lawn in the Capital District

Poor soil, poor turfgrass



Trophy house, lousy lawn



Soil challenges

- Sandy soil
- Heavy clay soil
- Stony soil
- Topsoil has been removed
- Slopes
- Compacted soil (good quality or poor quality)
- Dry conditions



Soil compaction during construction

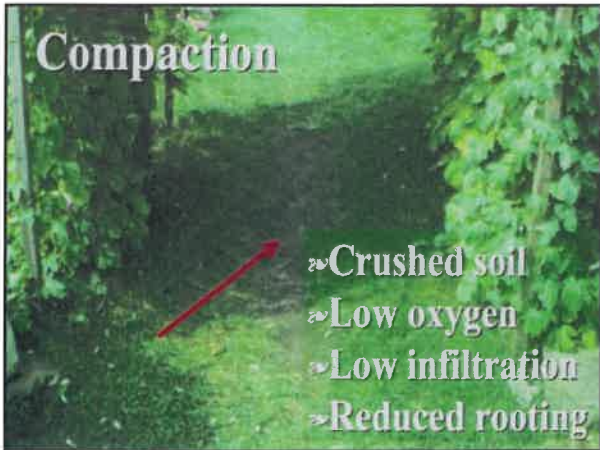
Soil types are influential

Foot traffic

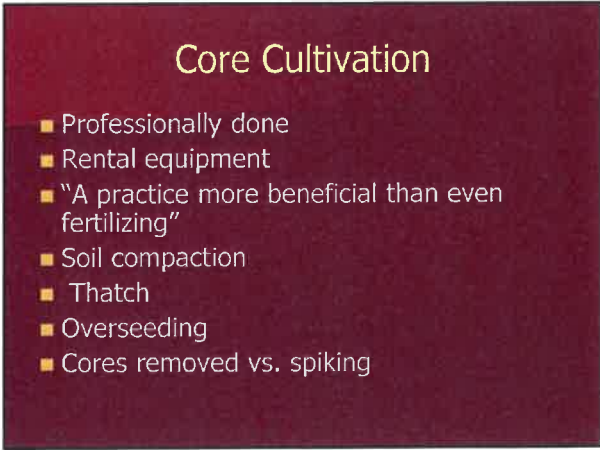
Compaction at surface

Layering

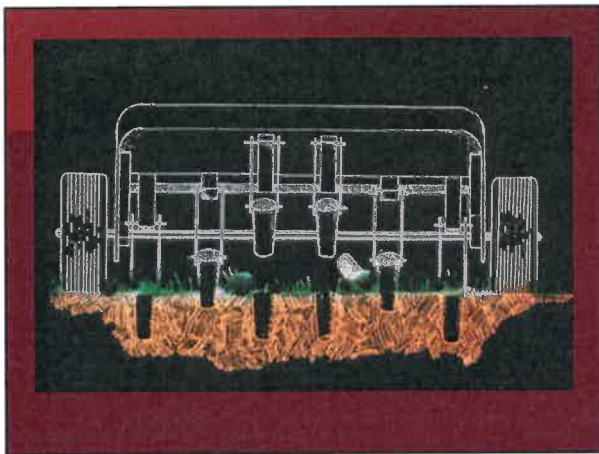


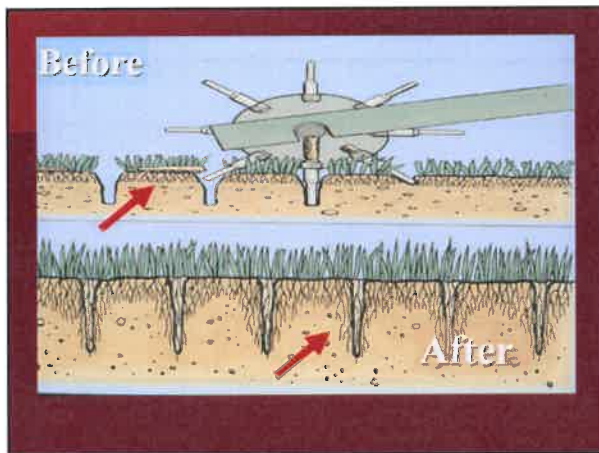
















Thatch

- Old crowns, leaf sheaths, rhizomes, etc.
- Kentucky bluegrass and fine fescues
- Highly maintained lawns
- Is all thatch bad?
- Grass clippings and thatch

What is thatch?



- Organic matter
- Roots, stems, etc.
- Not clippings
- OK up to 1"
- Insulates and cushions

How do you alleviate thatch?

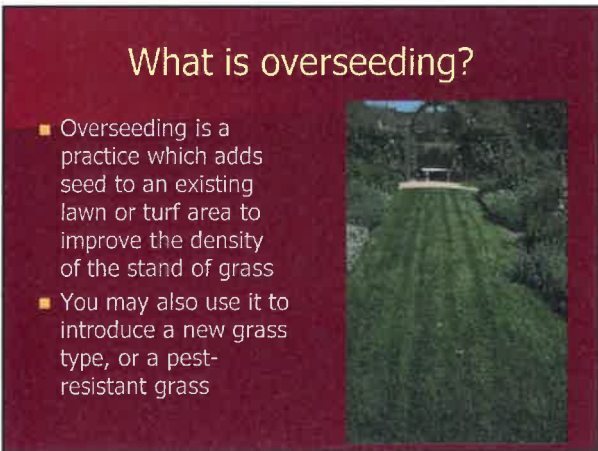
- Core cultivation
- De-thatching machines
- Liquid de-thatching products

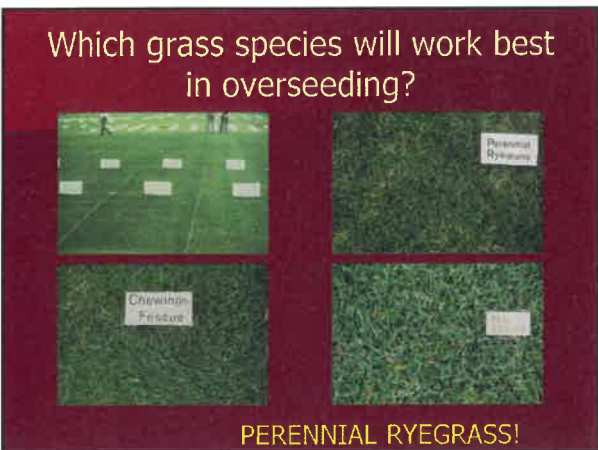


Thatch removal









New Idea: Heavy Repetitive Overseeding

- Put out perennial ryegrass with a drop spreader 3 or more times at 2 week intervals
- Use a rate of 2 to 4 lbs. of seed per 1,000 square feet
- Best starting right after Labor Day



3 rates of seed on heavily trafficked area



About 11 months later, density was over 90% in all plots



As the crabgrass dies out in the fall, the perennial ryegrass can move in



Plots had 85%+ desirable grass by late October, 2017



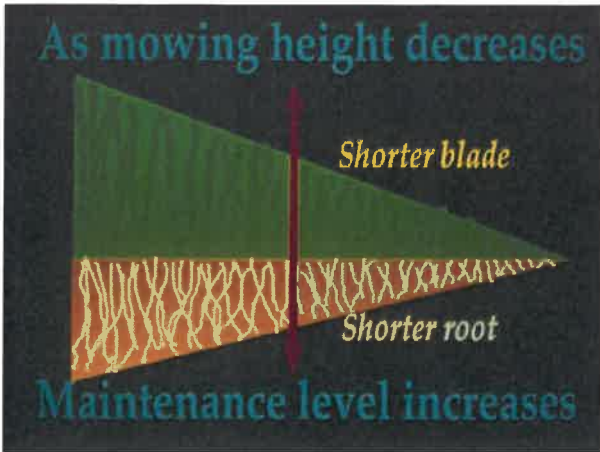
November 2017











Leaving Clippings

- Does not influence disease pressure
- Does not influence thatch
- Increases earthworm activity
- Does not reduce annual bluegrass infestations
- May return about 1 lb. of Nitrogen per 1000 sq. ft. per year
- May reduce dandelion infestations

Rotary mowers vs...

The image shows a green rotary mower on the left. On the right, there is a cross-section diagram of a rotary blade cutting through grass, showing the blade's curved shape and the resulting clippings.

Reel mowers



What is going on here?





Mowing efficiency

- A sharp mower blade increases efficiency 20-30%
- A 3.5 HP mower used for one hour releases as many pollutants as a new car driven 340 miles
- A fairway type mower uses 4 gallons of fuel per hour and emits 80 lbs. of CO₂
- Small equipment can release 25% of the gasoline in the tank as unburned exhaust

Mowing height matters



As mowing height increases, crabgrass decreases

Mowing Height (Inches)	% Crabgrass in September
1	96
2	63
3	22
4	4

Tall fescue turfgrass, with large crabgrass seeded into it. Doyle, Michigan State University, 2008

Leaf mulching



The future... robotic mowers







Lime

Do you need to add lime?

Lawns like a pH of approximately pH 6.5

You must do a soil test!

Testing Soil pH

- Buy a test kit and test it yourself
- Take a sample to a local garden center or Cornell Cooperative Extension



Feed it right!



- » Soil test
- » Know size of area
- » Proper setting
- » Impervious surfaces
- » Spreader type



All spreaders need to be calibrated, especially when they come new out of the box!

FERTILIZER
21-3-20
N P K
50 lbs.

Nitrogen: key nutrient in plant growth. 21% N in a 50 lb bag = 10.5 lbs. N

Phosphorus: important for establishment. 3% P in a 50 lb. bag = 1.5 lbs. P

Potassium: will increase stress tolerance. 20% K in a 50 lb. bag = 10 lbs. K

P & K needed only as soil test indicates

New NYS Law!

- As of January 1, 2012:
- No P application on a lawn unless you are establishing a new lawn or a soil test indicates the need for P
- Prohibits the application of lawn fertilizer on impervious surfaces and requires clean-up of spills
- Prohibits the application of lawn fertilizer within 20 feet of any surface water (with some exceptions)

- Prohibits the application of lawn fertilizer between December 1 and April 1
- See our website for a summary of the law:
- <http://www.ccerensselaer.org/Home.aspx>



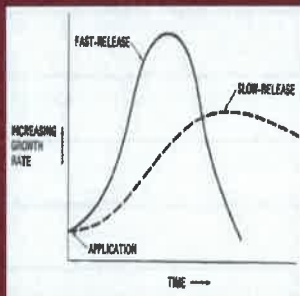
Testing Soil for Nutrients

- University of Massachusetts
- pH, P, K
- Mg, Ca, Al, Fe, Mn, Zn
- Organic matter
- Provides a fertility recommendation for up to three "crops"
- Lead level



Nitrogen Fertilizers

- Quick release
- Slow release, organic or synthetic
- Without a soil test, we generally base what we do in turf on supplying nitrogen
- General rule: no more than 1 lb. of N per 1,000 square feet per application



Slow vs. Quick Release Fertilizers

- | | |
|-------------------------------------|-----------------------------|
| ■ More constant supply of nutrients | ■ Quickly supply nutrients |
| ■ Lower burn potential | ■ Higher burn potential |
| ■ Slower response | ■ Faster response |
| ■ Low leaching potential | ■ Higher leaching potential |
| ■ More expensive | ■ Less expensive |

Cornell's Home Lawn Program

Maintenance Level	May	Jun	Jul	Aug	Sep	Fall	Total
Low					1		1-2
Medium	1				1		2
High	1				1	1	3

Lbs. of N /1000 sq. ft. /month

Fertilizer can be a problem in the environment



- Fertilizer (especially P, or phosphorous) can contaminate surface waters
- Do not apply fertilizer near a water source or on a paved surface
- Don't apply more than 1 lb./M of quick release N per application
- Be careful on sandy soils

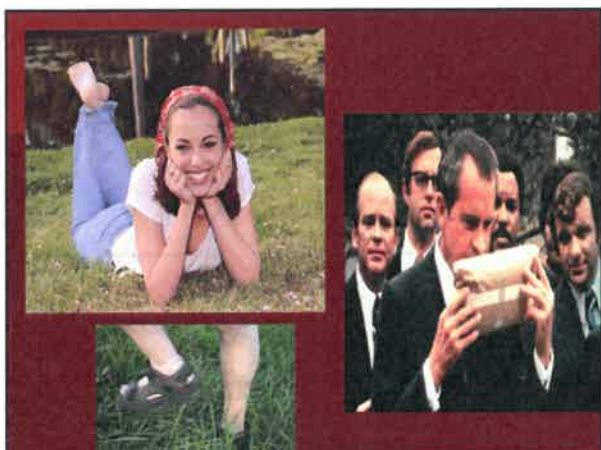
Fertilizer and the environment

- There is increasing evidence that the level of nutrients held in soil and thatch increases over time
- Lawns older than 15 years may not need as much N, P, K as a new lawn
- Even use of organic fertilizers (slow release) may lead to excessive nutrient levels over time
- Need to create new recommendations for new vs. older lawns
- High K in fall is also just a marketing tool – little evidence to support the "winter hardiness" idea

What can you do?

- Soil test!
- New York has banned P in lawn fertilizer as of January 1 2012
- Re-consider how many times you fertilize per year
- Calibrate spreaders carefully
- Watch paved areas, open water, etc.
- No leaves at the curb





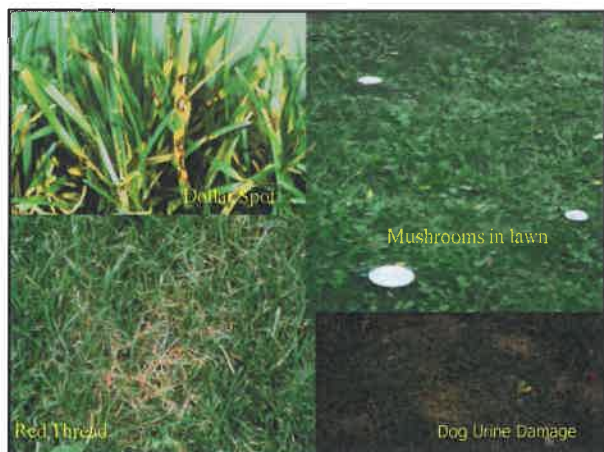
Lawn Diseases

When in doubt, call or bring a turf sample to CCE.

Capital District Turfgrass Diagnostic Lab



- How do you know what is wrong with your turf just by looking at it??
- Call Cornell Cooperative Extension of Rensselaer County at (518) 272-4210



Lawn Weeds

- Grassy or Broadleaf?
- Annual, Biennial, or Perennial?

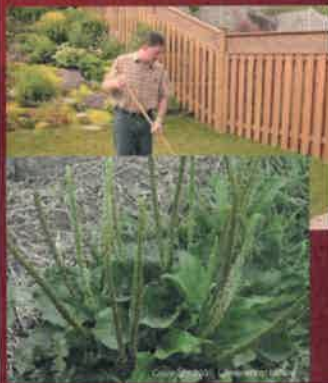
Lawn Weed Removal

Must-have weed removal tools

Herbicide

A fun and dangerous tool

Cultural Practices are Important!



- Spring raking...why?
- Broadleaved plantain seeds stay viable for 60 years
- Need light to germinate
- When you rake, you give weed seeds the "green light" to grow

Want to get rid of your weeds?

- How many weeds can you tolerate?
- Weed ID is critical
- Some weeds (such as annual bluegrass, quackgrass, orchardgrass) are almost impossible for homeowners to manage
- Herbicides are the quickest and easiest option

Do these weeds live in your lawn?



How can we manage broadleaved weeds?

- 2,4-D herbicide will kill many broadleaved weeds but leaves the grass alone
- 2,4-D is used in spring or fall
- 2, 4-D is sometimes mixed with mecoprop or other herbicides (including triclopyr or diclorprop) and is readily available to homeowners
- Timing is key for good weed death!

Ground ivy



Ground ivy

- Rounded leaves with teeth on edges
- Tubular light purple flower in spring
- Aggressive spreader via stolons
- Spread into landscape beds
- Distinctive odor



Iron Herbicides

- Introduced in 2011
- Spot treatment application
- Contains iron, which is absorbed and oxidizes the plant
- Selectively kills weeds, causes grasses to turn darker green
- Liquid formulation
- Said to manage dandelion, English daisy, white clover, black medic, bull thistle, Canada thistle, common chickweed, creeping buttercup, Persian speedwell, slender speedwell, broadleaf plantain, narrow-leaved plantain, mosses, algae
- "Ortho Elementals Lawn Weed Killer" and "Fiesta"
- Will likely need 2 to 3 applications 3 to 4 weeks apart

FIESTA™

Turf Bio-Herbicide

Before FIESTA



After FIESTA (2 apps, 41 days)



ENGAGE AGRO

Our Study- Easiest to control

- Henbit, ajuga, white clover, oxalis and motherwort were controlled with one application in June



- Ground ivy was largely controlled by one June application, and completely controlled by two applications about 3 weeks apart
- Two apps were needed for ground ivy in late summer/early fall



Broadleaf plantain

- Two June apps gave about 90% control in a sunny area; 3 apps needed for 100% control
- Two late summer/fall apps seemed to be slightly more effective



Sprayed on June 8 and June 21



Photo on June 5

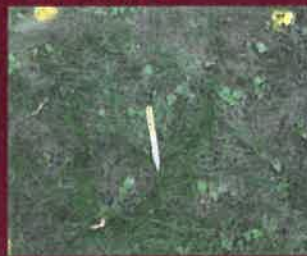


Photo on July 13

What is this and why do we grow it?



When the forsythia blooms, it is time to apply your pre-emergent crabgrass product.



Can we use a pre-emergent herbicide on a newly seeded patch or entire lawn???

- No!
- And yes!
- Siduron (or Tupersan) and mesotrione are the only safe herbicides for new lawns

What is Mesotrione?

- Sold as "Tenacity"
- Sometimes sold mixed with starter fertilizer
- A "reduced risk" pesticide
- Rapidly degraded by soil microorganisms to CO₂
- Has low leaching potential
- Can be used as a pre-emergent as well as a post-emergent herbicide



What is Mesotrione? #2

- Disrupts pigment development and causes "bleaching" in over 50 weed species
- Safe on grasses including KBG, PRG; use care with FF



Inspired by the lemon bottlebrush plant, which produces leptospermone as an allelopathic substance. Mesotrione is based on leptospermone.


What is a "reduced risk" pesticide?


- Meets EPA criteria such as:
- Low impact on human health
- Lower toxicity to non-target organisms
- Low potential for groundwater contamination
- Low use rates
- Low pest resistance potential
- Compatibility with IPM practices

http://www.uvm.edu/~fruit/grapes/gr_ipm/ReducedRiskPesticides.pdf

A Few Lawn Pests

"What is killing my lawn?"





Chinch Bug

- Adult 3/16 inch long
- Start red, then gray, then black with white wings
- Piercing-sucking mouthparts
- Prefer hot dry weather
- "True bug"
- Incomplete metamorphosis

Chinch Bug Cycle

- Two generations per year
- Adults overwinter in leaf litter and thatch
- Female lays up to 300 eggs in 40-50 days



Chinch Bug Damage



Voorheesville, NY
Fall 2018

- Cool weather promotes the fungus disease Beauveria
- Second generation = more damage
- Feed on all types of grasses
- Monitor in July and August
- Yellowing then browning patches

Chinch bug detection device



Official threshold is 25 bugs per square foot

Chinch Bug Treatment

- Management primarily using insecticides
- Some cultivars differ
- 'Baron' and 'Newport' Kentucky Bluegrass and 'Pennfine' and 'Manhattan' perennial ryegrass show some resistance
- Endophytes



Hairy chinch bug adults, normal and short winged forms

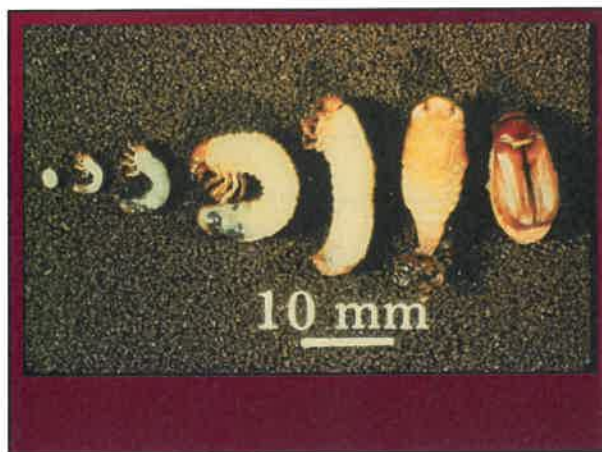
Chemical insecticides for chinch bug management (homeowners)

- Carbaryl, bifenthrin, cyfluthrin, imidacloprid
- Read label before applying, but probably will have to:
- Water lawn before and maybe after applying
- May need a follow-up treatment in 2 to 3 weeks

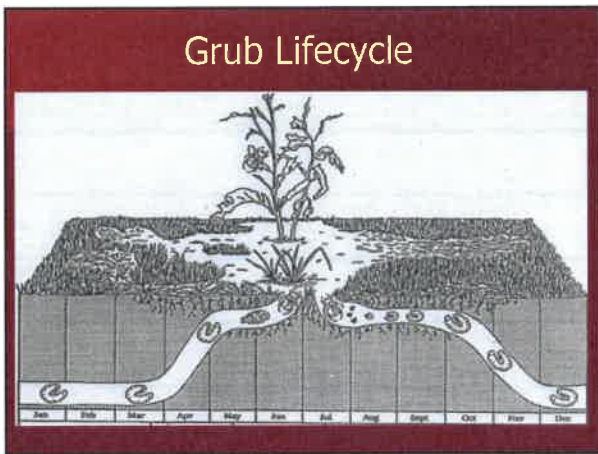






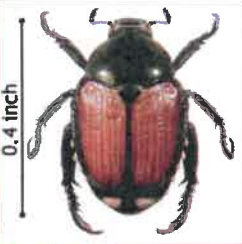







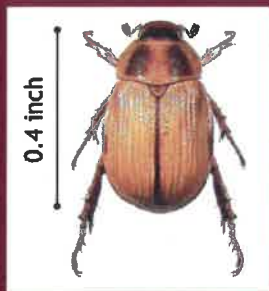
Japanese Beetle

- Feeds within 2 inches of surface
- Often feeds within thatch
- Record count = 122 grubs per sq. ft.



Oriental beetle

- Initially these grubs feed on dead organic matter, but they later feed on live turfgrass roots
- Prevalent in parts of our area (Averill Park!)



European Chafer



European chafer adult

- Feeds within 1-2 inches of surface
- Mobile pests
- Feed later in fall and earlier in spring
- Often hard to kill with chemical pesticides
- Larger than Japanese

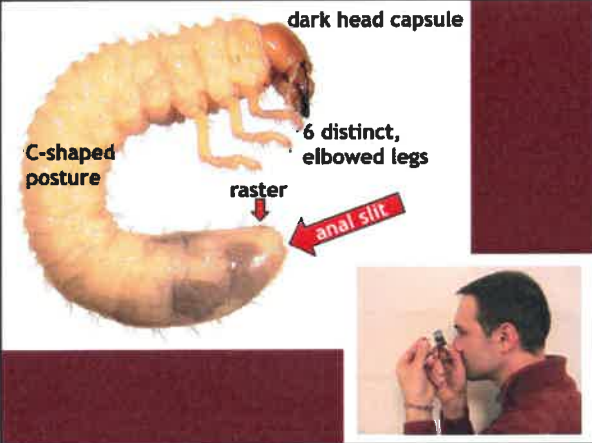
European chafer



"Grub ID Key Cornell"



<http://grubid.cals.cornell.edu/>



dark head capsule


C-shaped posture

6 distinct, elbowed legs

raster

anal slit

Biological grub indicators



Scouting scenes at Pelham Country Club



Looking for eggs or first instars



Insecticides for White Grub Control

- Chlorantraniliprole – branded "Grubex," "Acelepryn," others
- Imidacloprid – can be branded "Grubex" as well!
- Trichlorfon – "Fast-acting"
- Carbaryl
- Azadiractin
- Acephate
- Chlorpyrifos
- Bifenthrin
- Cyfluthrin

Biologicals for White Grub Management

- Entomogenous nematodes
 - *Steinernema glaseri*
 - *Heterorhabditis bacteriophora*



Nematodes for white grub management

- Entomogenous nematodes
 - *Heterorhabditis bacteriophora*
- Sensitive to UV light, temp., pesticide residue
- Apply at 250 million to 1 billion per acre
- Cost: \$250 for 250 million (March 2019)
- Check for VITALITY when they arrive in the mail!



"B.t." for White Grub Management NEW!

- *Bacillus thuringiensis* Variety *galleriae* Strain *SDS-502*

"B.t." is a bacteria. The grubs eat it, and it acts as a stomach poison. They stop eating in hours, but may not die for days.



Mechanical management for grub control

- Whitney Cranshaw, University of Colorado, claimed in 1989 that 3" spiked sandals controlled 56% of the grubs in test plots
- No mention of how much aerifying was actually done



Mechanical management for grub control

- Dr. Ben McGraw of SUNY-Delhi has demonstrated that up to 81% of the grubs can be killed by aerifying
- 2 times, same day, 1 inch tines, hollow or solid tines, spaced 1.5 inches apart



The End