# Turfgrass Pest Management

Erin W. Hodgson
Extension Entomologist
Utah State University

Utah Green Conference
Sandy, Utah; 22 January 2007

# Outline

- Basics of IPM
- Best management practices in turf
- Most common turf pests
- Where to get more information

# Early detection is key!

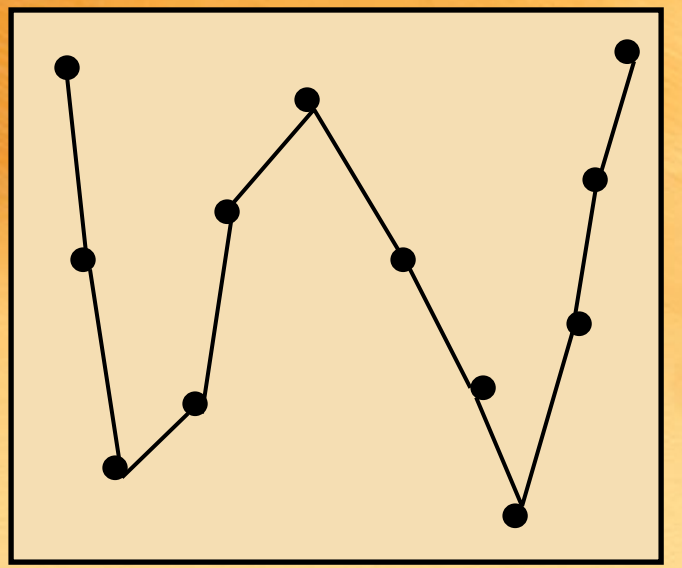
- Scouting is best IPM tactic
  - Detect early infestations
  - Prevent widespread outbreaks
  - Use spot treatments to reduce damage

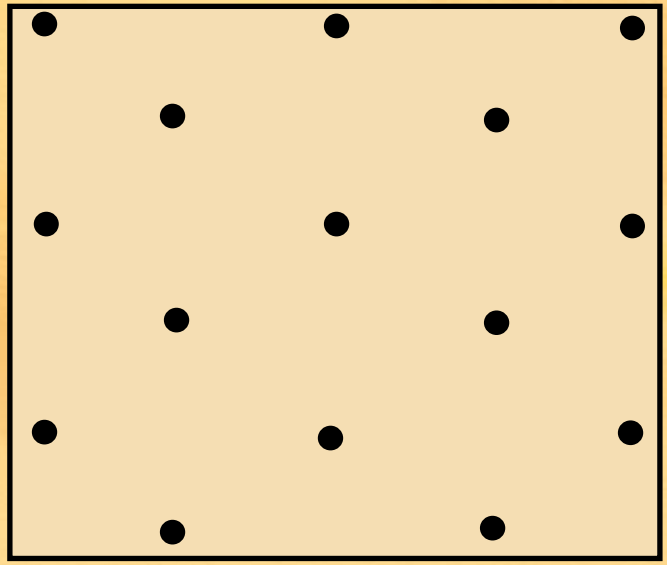
- Regular inspections are necessary
  - Confirms presence/absence
  - Assess the need for action
  - Evaluate treatment efficacy
  - Develop site history

# Scouting techniques

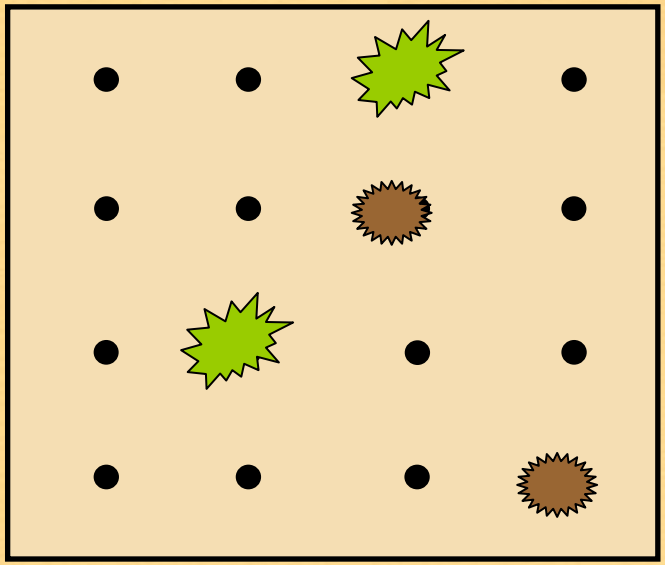
- Observation
- Soil samples
- Irritants (i.e., detergents)
- Pit fall traps
- Sweep nets
- Sticky traps
- Pheromone/light traps

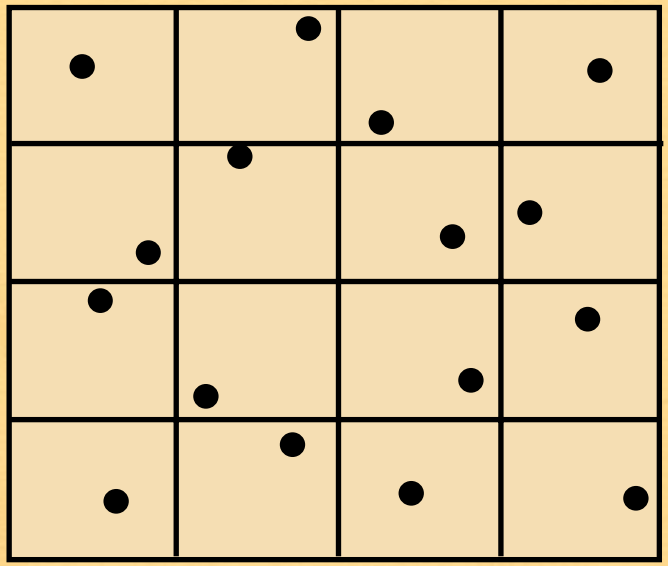
Try to use a uniform sampling design to ensure coverage of turf





Random or uniform sampling??





# Soil sampling

- Start scouting for insects in June
- Scout for adults weekly
- Start scouting for eggs, larvae in August

# Biological Control

- Insects controlling pests
- Predators, parasitoids, pathogens
  - Most pests have enemies
  - Will respond to low/moderate density
- Encourage natural enemies
  - Use native nectar-producing plants
  - Avoid monocultures

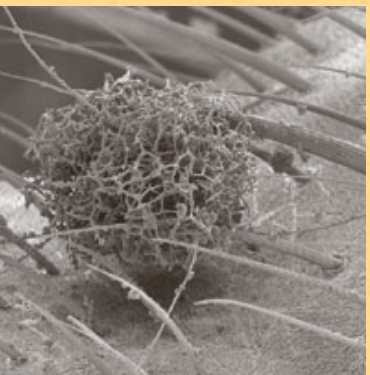
# Examples of biocontrol

- Arthropods (sample the good, bad and ugly!)
  - Ladybeetles, ground beetles
  - Big-eyed bugs, lacewings
  - Predaceous thrips and mites
  - Parasitic wasps and flies



# Examples of biocontrol

- Arthropods (sample the good, bad and ugly!)
  - Ladybeetles, ground beetles
  - Big-eyed bugs, lacewings
  - Predaceous thrips and mites
  - Parasitic wasps and flies
- Fungi, bacteria, viruses, nematodes




Parasitoid wasp


Ladybug

Lacewing

# Chemical control

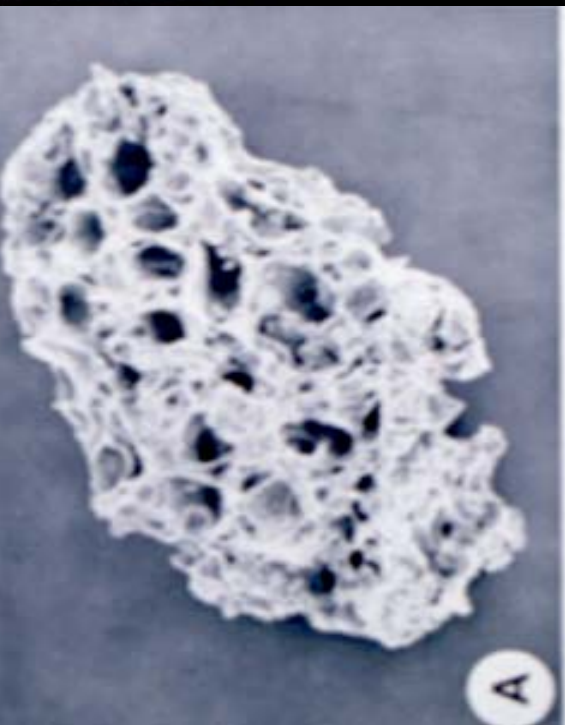
- traditional pesticides
  - broad spectrum, long residual, toxic
  - pyrethroids, organophosphates, carbamates
- reduced risk "softer" pesticides
  - selective, short residual, earth-friendly
  - microbial (bacteria, nematode, fungi)
  - soap, oil, dust, mineral (zinc, copper, sulfur)
  - botanical (pyrethrum, nicotine)

# Microbials

- kill, reduce reproduction, or shorten the life
- usually specific to target species or to life stages
- depends on environment or host abundance
- control by pathogens may be unpredictable
- relatively slow acting; they may take several days or longer to provide adequate control

# Suffocants, Desiccants

- Soaps, oils, sucrose esters, dusts, DE
  - Smother to prevent breathing
  - Acts by disrupting the waxy outer layer (cuticle) of soft-bodied insects, causing the insect or mite to dry out and die
  - Concern®, Safer®, Sucrocide®, Dri-Die®, Bonide®, Entrust®, Success®
- Kaolin clay (Surround®)
  - Physical barrier, excessive grooming


A


C


E

# Botanicals (aka plant derived)

- Neem (neem trees)
  - Trilogy®
- Pyrethrum (pyrethrum daisy)
  - Pyganic®, Evergreen®
- Rotenone (subtropical leguminous shrubs)
  - Pyrellin® (mixed with pyrethrins)
- Spinosad (bacterial fermentation)
  - Conserve®, Success®, Entrust®

# Not all turf is the same

- Cool season
  - Kentucky bluegrass, tall fescue, perennial ryegrass, fine fescues, bentgrass
  - Grow best between 60-70°F (spring and fall)
- Warm season
  - Zoysiagrass, bermudagrass, buffalgrass
  - Grow best between 80-90°F (summer)
  - Heat and drought tolerant

# Best management practice in turf

- UT homeowners use 2/3 of total water for the landscape
- Efficient water use is critical
  - Check irrigation system before 1st use
  - Confirm application rate
  - Use an irrigation timer
  - Flush irrigation after last use

Kopp and Hoover; www.hort.usu.edu/pdf/kelly/Irrigation.pdf

# Use an irrigation schedule

Be dynamic!

| | |
|---|---|
| • Startup until April 30 | every 6 days |
| • May | every 4 days |
| • June - August | every 3 days |
| • September | every 6 days |
| • October until shutdown | every 10 days |

Kopp; www.hort.usu.edu/pdf/kelly/New%20Folder/WCUrban.pdf

# Irrigation

- Know your soil type
- Water less frequently, but more deeply
  - Ideal rate is 1" per application
  - Aeration may improve infiltration
- Water between 6 pm and 10 am
  - Minimize evaporation water loss
- Don't forget about your ornamentals!

Kopp and Hoover; www.hort.usu.edu/pdf/kelly/Irrigation.pdf

# Fertilization

- Consider your level of activity
- Fertilize when plants are growing
- Cool-season grasses
  - Need 2-3 lbs N/1000 $ft^2$/year
  - Need 3-5 lbs N/1000 $ft^2$/year for high traffic

| Traffic Use | May | June | July | September | October |
|---|---|---|---|---|---|
| Low | 1 | | | 1 | |
| Medium | 1 | | | 1 | 1 |
| High | 1 | 0.5 | 0.5 | 1 | 1 |

Kopp and Johnson; extension.usu.edu/files/publications/publication/HG_517.pdf

# Mowing

- Keep turf between 2-4 inches
- Never take off more than 1/3 at one time
  - Use sharp blades
  - Taller grass means deeper roots
  - Taller grass collects more sunlight
- Return mulch when possible
  - Return nitrogen
  - Help to decrease evaporation

Kopp and Johnson; extension.usu.edu/files/publications/publication/HG_517.pdf

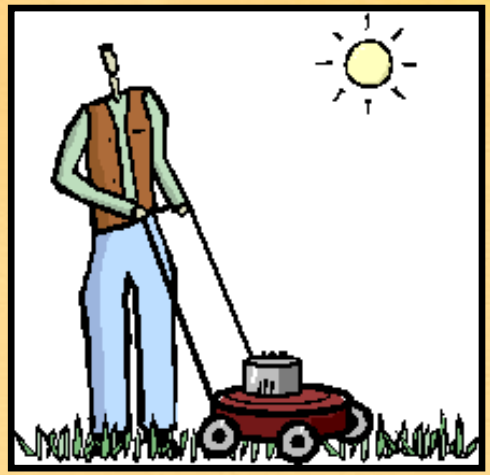
# Turfgrass pests

- Turf pests grouped by feeding location
  1. Soil – damage root system
  2. Surface – feed above ground

- Soil-active insects are more harmful
  - Injury occurs at growing point
  - Soil offers protection from enemies
  - Difficult to detect, control

# Common damage symptoms

- General thinning of grass
- Spongy, depressed areas
- Irregular brown patches
- Grass easily breaks away



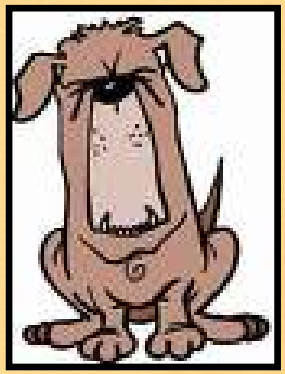
*all of these can be confused with heat, drought stress, nutritional deficiencies, disease, chemical burn, animal feeding!

# Dead or dormant?

- Cool season grass will go dormant if it's too hot
- Watering will not make turf green
- Reduce mowing and traffic

# Friend or foe?

- Dogs can cause brown/yellow spots
- High nitrogen concentration in urine
- Often confused with insects/disease
- Watering spots may help reduce damage



# Most common turf pests in UT

- Billbugs
- Sod webworms
- Cutworms/armyworms
- Spider mites
- White grubs

- Sample *before* signs of injury!

# Billbugs

- Immature weevils (snout beetles)
  - Denver, bluegrass, hunting
- Creamy colored, legless, "puffy rice"
- Larvae hollow out grass stems
  - Fine sawdust-like debris, frass
  - Stem discoloration, stems break away
- April/mid-May is optimal control
  - Threshold: 20 larvae/$ft^2$

# Sod webworms


- Immature snout moths
  - Complex of >20 species
  - Adults are buff-colored, head projected forward
  - Larvae are grey/tan with dark spots, brown head
- Larvae feed on leaves near surface
  - Ragged brown spots, frass
  - Adults fly over turf in "zigzag" pattern
- 1-3 generations/year; target young larvae
  - Threshold: 15 larvae/$ft^2$

# Cutworms/armyworms

- Immature noctuid moths
  - Adults are hairy, dark-colored
  - Larvae are dark, distinct head

- Larvae feed on leaves near surface
  - Small circular dead spots
  - Skeletonized leaves, frass

- 1-3 generations/year
  - Target young larvae
  - Threshold: 5 larvae/$yd^2$

# Spider mites

- Twospotted, Banks grass, clover
  - Tiny, oval shaped, various colors
- Colonies feed on leaves
  - All stages feed, 7-10 generations/year
  - Reproduce rapidly in hot, dry weather
- Grass turns yellow and dry out
- Target growing colonies (some are resistant)
  - Irrigation can alleviate outbreaks

# White grubs

- Immature scarab beetles (grubs)
  - May/June, Masked chafer, Japanese
- Creamy colored, C-shaped body
- Larvae feed on turf roots
  - Patches of pale, dying grass
  - Spongy grass from large infestation
- Control young grubs




# White grubs

- Immature scarab beetles (grubs)
  - May/June, Masked chafer, Japanese
- Creamy colored, C-shaped body
- Larvae feed on turf roots
  - Patches of pale, dying grass
  - Spongy grass from large infestation
- Control young grubs

# White grub life cycle

- Masked chafer has 1-year cycles
  - Adults are tan, 5/8” long, dark head
  - Attracted to lights
- Japanese beetle has 1-year cycle
  - More about JB later…
- May/June beetles have 3-year cycles
  - Adults are tan to brown, 5/8 – 7/8” long
  - Adults can damage ornamentals
  - Attracted to lights

# Black turfgrass ataenius

- 2 generations per year
  - Overwinter in leaf litter, debris
- Much smaller than other grubs, 1/4” long
- Damage to golf courses most common

# Grub treatment guidelines

| Insect | #/ft$^2$ | #/4" core |
|---|---|---|
| Masked chafer | 8-10 | 1 |
| June beetles | 3-5 | 1 |
| Japanese beetle | 8-10 | 1 |
| Black turfgrass ataenius | 30-50 | 3-5 |

# Japanese beetle in UT

- Initially detected in Orem, July 2006
- UDAF set up trapping network
- Not detected outside original “hot spot”
- More than 600 adults have been trapped

# JB biology

- Adults have a broad host range
  - Rose, apple, stonefruits, Virginia creeper, willow, elm, birch, maples, pin oak, sycamore
  - Strongly attracted to ripening fruit
  - Release a mating/feeding pheromone
- Grubs feed on turfgrass roots
  - Overwintering stage
  - Can weaken turf system

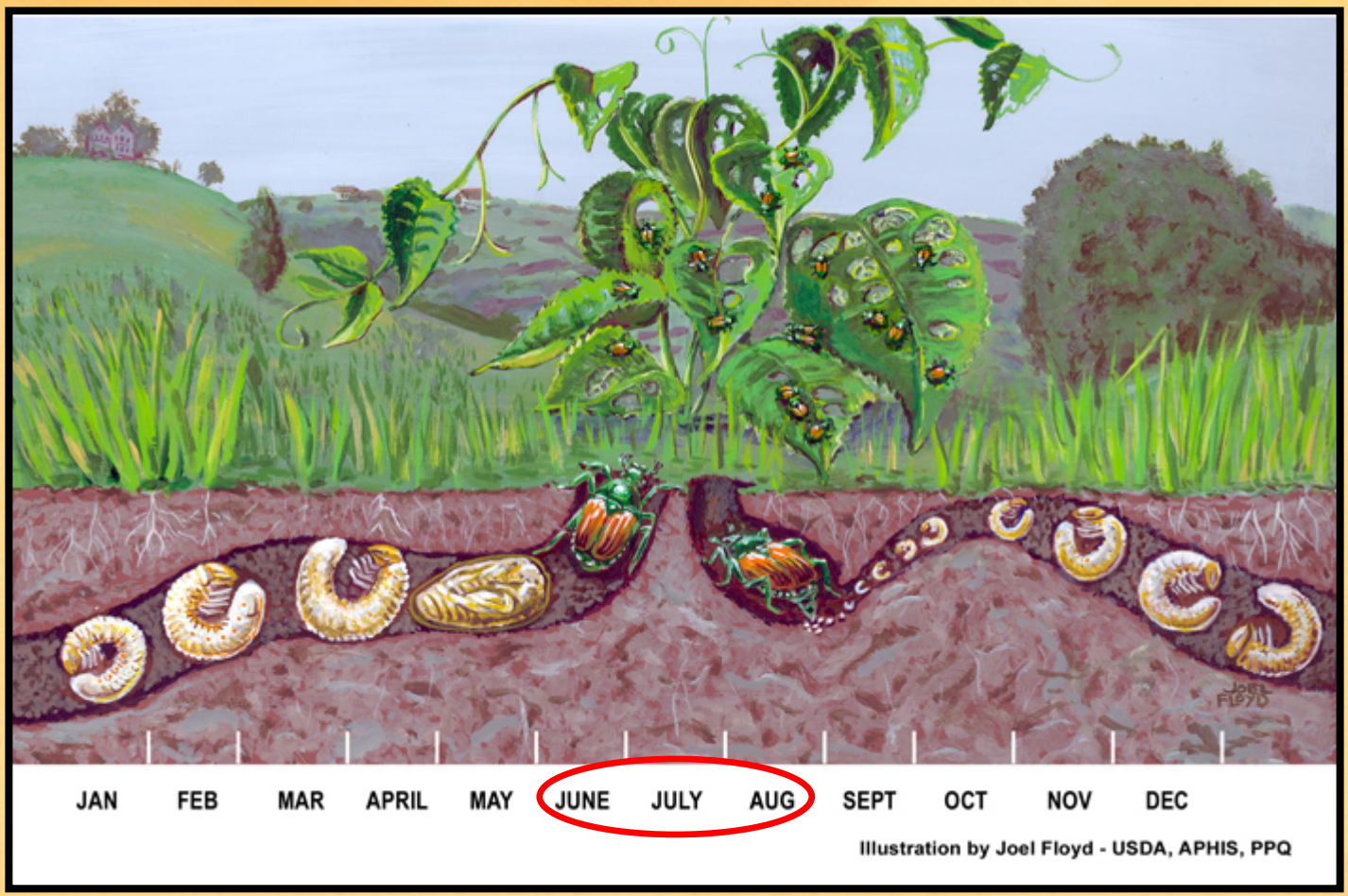
# JB description

- Adults
  - oval, ~1/2” long scarab beetle
  - Metallic green with bronze wing covers
  - Six white tufts along each side
  - Clubbed antennae


# JB description, cont.

- Eggs – white, laid in small clusters
- Larvae (grubs)
  - C-shaped, ~1” long fully developed
  - Creamy white, brown head, dark “butt”
  - 3 pair of thoracic legs, no prolegs
- Pupae – white, fragile

# JB life cycle



# JB damage - adults

rose



blueberry

Virginia creeper

linden

# JB damage - grubs

- Small patches of turf destroyed
- Patches coalesce, quickly
- Spongy turf, easily pulled back

# JB IPM

- Keep plants healthy
  - Follow fertilization/irrigation schedules
- But not “too healthy”
  - Over fertilized turf becomes attractive
  - i.e., golf courses, parks
- Include non-attractive plants
  - Lilac, forsythia, dogwood, magnolia

# JB trapping

- Use a pheromone trap (catch ~75%)
- Start monitoring early, look for damage
- Trece Inc.

P.O. Box 129
Route 1, Box 1765
Adair, OK 74330

P: 866.785.1313
F: 918.785.3036
www.trece.com

# JB control

- Adult control is difficult
  - Wide host range
  - Continuous feeding/mating movement
  - Insecticides are not recommended (at this time!)

- Many insecticides are available
  - Bayer Advanced®, Baythroid®, Concern®, malathion 5, Merit 2.5 G ®, Orthene®, Pounce®, Proaxis®, Sevin 4F®, Warrior®
  - Insecticidal soap, Conserve®

# Considerations for JB adult control

- Flight is greatest on clear days, 84 - 95°F, winds <12 mph.
- A few beetles on plants will attract more; keeping numbers and damage low can mean fewer new arrivals.
- Adults begin feeding on plant tops and then move down - can pose coverage problems on large trees. Be aware of spray drift and applicator exposure.
- Some insecticides (carbaryl/permethrin) may flare non-targets. Use acephate or malathion if needed. Repeated applications may be necessary with short-residual products. Also, significant rainfall shortly after an application may reduce the effectiveness.

# JB grub control

- Grub control is difficult
  - Threshold is 8-10/$ft^2$ with obvious damage
  - Treat if persistent grub damage is visible
  - Pushing product down in the soil
  - Insecticides are not recommended (at this time!)

- Insecticides are available
  - Merit 0.5G®, GrubEx® before egg hatch
  - Dylox 6.2G® for grub outbreaks

# JB grub control

- Light aerification if thatch > ½”
- Pre-irrigate 48 hours
- Post-irrigate ½ - ¾”, then mow
- Repeat irrigation every 4 – 5 days


# Summary

- Insect turf damage can be minimized
- Implement best management practices
  - Thatch, irrigation, fertilization, mowing
  - Create healthy turfgrass
  - Reduce pests, disease, weed problems
- Be ‘OK’ with less than perfection!

# More information

- http://utahpests.usu.edu
- www.hort.usu.edu/html/extension/extension.htm
- extension.usu.edu/htm/horticulture

- Destructive turfgrass insects: biology, diagnosis and control. ISBN 1575040239
- Handbook of integrated pest management for turf and ornamentals. ISBN 0873713508


# Thank you!

erin@biology.usu.edu

435.797.5689

utahbugs.usu.edu