Turfgrass Pest Management

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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

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• **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®, Sucroicide®, Dri-Die®, Bonide®, Entrust®, Success®

• Kaolin clay (Surround®)
  – Physical barrier, excessive grooming
Botanicals (aka plant derived)

• Neem (neem trees)
  – Trilogy®

• Pyrethrum (pyrethrum daisy)
  – Pyganic®, Evergreen®

• Rotenone (subtropical leguminous shrubs)
  – Pyrelin® (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

- 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

Be dynamic!

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 ft²/year
  - Need 3-5 lbs N/1000 ft²/year for high traffic

Traffic Use         May       June     July        September  October
Low               1         1         1
Medium           1         0.5       0.5       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/ft²
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/ft²
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/yd²
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

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  - 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

<table>
<thead>
<tr>
<th>Insect</th>
<th>#/ft²</th>
<th>#/4” core</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masked chafer</td>
<td>8-10</td>
<td>1</td>
</tr>
<tr>
<td>June beetles</td>
<td>3-5</td>
<td>1</td>
</tr>
<tr>
<td>Japanese beetle</td>
<td>8-10</td>
<td>1</td>
</tr>
<tr>
<td>Black turfgrass ataeinios</td>
<td>30-50</td>
<td>3-5</td>
</tr>
</tbody>
</table>
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

Virginia creeper

blueberry

linden
JB damage - grubs

• Small patches of turf destroyed
• Patches coalesce, quickly
• Spongy turf, easily pulled back
• 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   P: 866.785.1313
  Route 1, Box 1765   F: 918.785.3036
  Adair, OK 74330   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/ft² 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!

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