Turfgrass IPM and billbug dynamics

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Outline

• Basics of IPM
• Common turfgrass pests
• Billbug biology and control
Importance of turfgrass in UT

• $40 million sod industry (+ maintenance)
• What am I doing?
  – Fact sheets; USU Extension turf advisory
  – Field days/presentations (CEU’s)
  – Organic golf course management in UT (EPA)
**Turfgrass IPM Advisory**

**Turfgrass Pest Management**

The management of turfgrass insect pests and diseases is most effective when an integrative approach is taken. Oftentimes, cultural practices will help grasses to resist and recover from pest damage. Resistant turfgrass varieties may also be available.

**News/What to Watch For**

Diagnosed insect pests in the fall of the year have included armyworms, sod webworms, cutworms, white grubs, and billbugs. Diseased grasses have included necrotic ring spot, fading out (Curvularia blight), pink snow mold, and take-all patch.

**Insect and Disease Activity and Information**

**White grubs** (Gracillaria crenipennis)

**What You Should Know**

- White grubs are also known as scarab beetles, which are the larval stage of these insects.
- Several different kinds of white grubs are found in Utah, including the western chafers and Japanese beetles.
- White grubs prefer to feed on turf grasses, but they can also cause damage to other plants in the area.

**Damage Symptoms**

White grubs feed on the roots of grasses, causing them to become weak and die. This can lead to a loss of turf quality and decreased use of the area.

**Description**

Adult scarbs are known for their distinctive "bark-and-dig" behavior, which involves rasping the topsoil to find insects. When disturbed, they will quickly escape into the soil. The grubs themselves are white and have a segmented body.

**Bee Healthy in Utah**

Bee health is a hot topic in the entomology world, and for anyone depending on pollinating insects. Most likely, you have heard about widespread honey bee colony death in the Unites States. The cause of this phenomenon is called Colony Collapse Disorder (CCD).

**What's Inside**

- Onion Powdery Mildew
- Snow Mold on Turf
- Caprines Ails
- Cucumber Wilt
- Powdery Mildew Resistance
- Soil and Tissue Testing in Outdoors
- Calendar of Events, News, Publications, and Web Sites of Interest

**News Highlights**

**New UT Agr. Pest FACT SHEETS**

The following can be found on our Web site:

- Alkali Eyes Nematode
- Soldier Beetle
- Ticks
- Birds
- Black-grass Borer
- Human Louse
- Barley Yellow Stripe
- Pest Management Guides
- Wheat Dyes Pest

**Bee Healthy in Utah**

A normal honey bee hive (above) has capped brood and many adult workers. Honey bees eating excessive Iberian brood.

**Continued on next page**
Basics of IPM

- Scouting
- Mechanical
- Cultural
- Genetic/Variety
- Biological
- Chemical
Goals of Turf IPM

- Assemble YOUR insect spectrum
- Create YOUR pest calendar
- Make dynamic decisions
- Evaluate YOUR Program
Scouting turfgrass insects

• Observation and Recording are key!
  – *What insects are present?*
  – *When are adults/immatures present?*
  – *Can I make predictions for next year?*
Why scout?

- Confirms presence/absence
- Estimate density
- Assess need for action
- Evaluate treatment efficacy
- Develop site history
Scouting tools

• Golf course cup cutter (4” diameter)
  – Soil-dwelling life stages
• Pheromone traps
  – Target initial adult detection
  – Usually species-specific; beetles, moths
• Pitfall traps
  – Walking adults in the spring/fall
Scouting pattern

• Use uniform design to ensure coverage
• Work around landscape/hardscape features
• Estimate average/ft\(^2\)
  – 10 soil cores = 1 square foot
  – Remember to count zeros
  – Describe aboveground damage
Mechanical Control

• Thatch management
  – Organic matter production exceeds decomposition
  – Insulates soil temperature changes
  – Can reduce cold and drought tolerances
Aeration

• Consider if thatch >½”
  – Soil should be moist, not saturated
  – Turf should be actively growing (30 days after)
    • Early spring/after Labor day
    • May require herbicide?
  – Power raking
    • Slicing and lifting thatch
  – Core aerification prevents accumulation
Cultural Control

• Water management
  – Water deeply and infrequently
  – Stronger root system
  – Avoid irrigation during egg-laying periods

• Light management
  – White grub adults attracted to lights
  – Damage under street lights/athletic fields
  – Use sodium vapor/yellow lights
Picking the right turfgrass

- National Turfgrass Evaluation Program (NTEP)
- Start with pest-free sod
- Extensive root systems
- Endophyte-enhanced (30-40% stand)
  - Perennial ryegrasses and fescues
  - Best for leaf and stem attacking insects
  - This includes billbug control
Predators and Parasites

• Can reduce immatures (caterpillars, grubs)
• Unreliable efficacy
• Can cause concern to people

ground beetle  tiger beetle
Pathogens

- Bacteria, fungi, nematodes
- Commercially available
- May need multiple applications
- May need 3-5 years to see effects
Consideration for Insecticides

- Deliver product into the target feeding zone
- Kill by contact and/or ingestion
- Breakdown quickly by UV and heat
- Accurately calibrate and apply uniformly
- Apply at vulnerable pest life stage
  - Variable for different insects
Target Zone

- 1-2” of soil for most soil-dwelling insects
- Thatch is a difficult barrier
  - Binding site for insecticides
  - Prevents mobility to soil
  - Reduces concentration/filters product
Ph Considerations

• Some products (carbamates) break down at pH >8
• Test water regularly (3-4 times/year)
• Test tank *after* product has been added
Liquid Insecticides

• Thatch should be wet
• Best applied as a course spray
  – Large droplets reach the thatch
• 3-4 gallons/1000 ft² (lawn care)
• 1 gallon/1000 ft² (golf course, boom sprayer)
• *Immediately* follow with ¼-½” irrigation
Granular Insecticides

• Grass blades should be dry
  – Particles will sift deeply into turf canopy
  – Prevents UV degradation
• Subsurface applicators slice grooves
  – Place granules at the target zone
• Follow with $\frac{1}{4}$-$\frac{1}{2}$” irrigation
Evaluate Efficacy

• Most products provide 70-90% control
• Check 10-14 days after treatment

• Did the treatment work?
• Did the treatment reach the target zone?
• Did the treatment reach vulnerable stages?
Soil and Thatch inhabitants

- Billbugs*
- Cutworms and armyworms*
- Mites
- Sod webworms*
- White grubs*, JB*

*Utah Pests fact sheet is available at utahpests.usu.edu!
Billbug adults

• Weevils - snout beetle, elbowed antennae
• Wandering walkers - don’t fly
• Will “play dead” if disturbed
Billbugs in UT

- Bluegrass billbug
- Hunting billbug
- Denver billbug
Billbug larvae

• White, legless with brown head capsule
• 1-2\textsuperscript{nd} instars found just below crown
• 3-4\textsuperscript{th} instars found just under thatch
Billbug or grub?
Billbug life cycle

• 1 generation per year
• Overwinter as adults away from turf
  – Migrate back to turf in spring
• Some may overwinter as larvae in turf
• Mate and lay eggs in the spring
• Feed all summer
Billbug damage

• Similar to drought-stressed turf
• Adults feed on stems
• Larvae feed on roots, crowns, stems
Turfgrass research

- USU collaboration with P. Johnson/K. Kopp
  - Greenville Farm, Logan UT
  - Define life history information for billbugs
  - Describe population dynamics
  - Refine sampling protocols
Core sampling for billbugs in 2007 and 2008.
Observations in Cache Valley

- Denver billbug is most prominent
- Large larvae are active in April (*overwintering?*)
- Peak larval activity late July – early August
Pitfall trapping for billbugs in 2008
Observations in Cache Valley

- Adults were active April – October
- Peak adult activity mid to late June
Summary

• Know your turfgrass
• Create goals
• Incorporate IPM
• Develop a site history
Where to get more information

• www.utahpests.usu.edu

• http://www.ntep.org

• *Destructive Turfgrass Insects: Biology, Diagnosis, and Control.* Potter. ISBN 1575040239.

THANK YOU!

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