Turf Insect Management: Billbugs, Sod Webworms, and White Grubs

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Utah Pests is a great resource!

- Entomology & Plant Pathology resources from USU Extension
- see this talk again (and many more!)
- fact sheets, advisories, newsletters
- how to submit a sample to the UPPDL
- photo gallery, FAQ’s, etc.

go to www.utahpests.usu.edu
Integrated Pest Management (IPM)

- Plan ahead (use preventive strategies where possible)
- Accurately identify problem
- Monitor regularly
- Treat only if needed (thresholds)
- Time treatments for “weak links” in pest life cycle
- Use multiple pest management tools
  - Cultural (Variety selection/Turf mgmt.)
  - Mechanical (Aeration/Thatch reduction)
  - Biological (Conserve beneficials/Use biologicals)
  - Chemical (Effective/Least toxic)
- Keep records
- Environmentally, economically, and socially sound
Proper Diagnosis!

Most plant health problems are not caused by biotic factors (pests: insects, diseases), but by abiotic factors (irrigation, environment, culture & care)

Lawn with dry area suggestive of sprinkler pattern problem
Identification of Insect Problems

Identify type of injury:
- Chewed leaves
- Short stems
- Stems break easily
- Sawdust-like frass
- Spongy turf
- "Turf roll-back"
- Predator digging

Look for presence of insect:
- Fat caterpillars
- Brown moths
- Small, legless grubs
- Large C-shaped grubs
Time Treatments for “Weak Links” in Insect Life Cycle

White Grubs
May & June Beetles

- Spring
- Summer
- Fall/Winter

Lay eggs late spring to summer - small larvae present in early summer

Pupate

3” to 12” deep
Turf Cultural Care

- Good lawn care (fertilize, mow, aerate, irrigation)
- Increase mowing height
- Amend soil (add OM)
- Select more tolerant turf species & varieties
- De-thatch
Mechanical

- Thatch management
  - Organic matter production exceeds decomposition
  - Insulates soil temperature changes
  - Can reduce cold and drought tolerances
  - Can reduce penetration of water & pesticides

> $\frac{1}{2}$ in.
Aeration

- Consider if thatch >1/2"
  - Soil should be moist, not saturated
  - Turf should be actively growing (30 days after)
    - Spring/after Labor day
    - May require herbicide?
- Power raking
  - Slicing and lifting thatch
- Core aeration prevents accumulation
Water & Light

- **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
Turfgrass Variety Selection

- National Turfgrass Evaluation Program (NTEP) - Paul Johnson, USU
- Start with pest-free sod
- Extensive root systems
- Endophyte-enhanced
  - Perennial ryegrasses and fescues
  - Best for leaf and stem attacking insects
  - Some tolerance to billbugs
Predators and Parasites

- Can reduce larvae (caterpillars, grubs)
- Unreliable efficacy
- Can cause concern to people

Ground beetle

Tiger beetle
Pathogens

- **Bacteria, fungi, nematodes** *(entomopathogenic)*
- Commercially available
- May need multiple applications
- May need 3-5 years to see effects
Major Turf Pests

**Surface / Thatch Feeders (leaf, stem):**
- Armyworm
- Cutworm
- Sod webworm
- Mites

**Surface / Crown Feeders (burrow into stem, crown):**
- **Billbugs**
- **Subterranean webworm**

**Subsurface (root):**
- **May & June beetles**
- **Black turfgrass Ataenius**
- Masked chafer
- Japanese beetle
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 (Northern UT)
Billbug larvae

- White, legless with brown head capsule
- 1-2nd instars found just below crown
- 3-4th 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 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
Dr. Erin Hodgson, USU Extension Entomologist

- 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 (suggests 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
Denver Billbug

Life Cycle
- Adults & large larvae overwinter in turf
- Begin feeding in spring
- Eggs laid in stems (spring to summer)
- Overlap of old & new adults in summer

Damage
- Mid June to early August
- Larvae feed within stems, crowns & on roots
- Abundant frass
- Stems break easily at crown
- Dollar spots grow into larger patches
Billbug Control

- Target small larvae (early summer)
- Threshold: 1 larva/sq ft
- Light irrigation to move materials into crown zone
- Tolerant turfgrass varieties (endophyte)
- Insecticides:
  - Chlorantraniliprole (Acelepryn™)
  - Clothianidin (Arena™)
  - Imidacloprid (Merit™)
  - Halofenozide (Mach 2™)
  - Scimitar™, Talstar™ & Tempo™ for adults
  - Chlorpyrifos (Dursban Pro™)
  - Carbaryl (Sevin™)
  - Beneficial Nematodes - Heterorhabditis bacteriophora (Cruiser™) & Steinernema carpocapsae (Scanmask™)
  - Fungus - Beauveria bassiana (Botanigard™, Naturalis™)
Subterranean Sod Webworm

- **Lepidoptera** (moth, caterpillar)
- AKA Cranberry girdler
- Snout moth
  - Off-white to gray caterpillars
  - Larvae feed in crowns & roots
  - Larvae form silken tunnels in soil to spend the winter
  - Adults emerge in mid June, active 6-8 wk
  - Buff to brown moths fly just above turf in zigzag pattern; especially near dusk
- **1 generation per year**
Subterranean Sod Webworm

**Damage**
- Thinning turf
- Larvae chew on crowns & roots
- When severe, sod becomes loosely attached to the soil
- Green frass accumulates at crowns
- Secondary damage from birds pecking holes in turf
Sub. Sod Webworm Control

- Target young larvae (summer to early fall)
- Threshold: 10-15 larvae/sq ft
- Increase mowing height
  - *Bacillus thuringiensis* (Deliver™) - must be ingested by small larvae
  - Spinosad (Conserve™)
  - Azadirachtin (Omazin™)
  - Chlorantraniliprole (Acelepryn™)
  - Clothianidin (Arena™)
  - Imidacloprid (Merit™)
  - Halofenozide (Mach 2™)
  - Scimitar™, Talstar™, Tempo™)
  - Acephate (Orthene™)
  - Carbaryl (Sevin™)
  - Diazinon
  - Chlorpyrifos (Dursban Pro™)
  - Beneficial Nematodes (Biosafe™, Biovector™ Exhibit™)
White Grubs
May and June Beetles (Phyllophaga)

- Scarab beetle family
- C-shaped white larvae
  - Brown head, legs
  - Eat roots
  - Turf roll-back
- 1-3 year life cycle
White Grubs

**Damage:**
- Root feeding, plants wilt, yellow, thin
- Irregular dead patches
- Turf not anchored to soil, “turf roll-back”
- Invasion by broadleaf weeds
- Secondary damage from small mammals & birds
- Most apparent in late summer when grubs are larger
White Grubs
1-3 year life cycle

Spring
Systemics
Non-systemics
Pupate

Summer
Systemics
Non-systemics

Fall/Winter

Can spend 1-2 years as 2nd to 3rd instar larva

2nd-3rd instars move 3” to 12” deep for winter
White Grub Control

- Target eggs & small larvae (late spring to early summer)
- Target larvae before they dig deep for the winter (late summer to early fall)

Thresholds:
- May/June beetles: 3-5 grubs/sq ft

Irrigate to move materials to grubs in the upper root zone

- Chlorantraniliprole (Acelepryn™)
- Clothianidin (Arena™)
- Imidacloprid (Merit™)
- Halofenozide (Mach 2™)
- Carbaryl (Sevin™)
- Chlorpyrifos (Dursban Pro™)
- Diazinon
- Trichlorfon (Dylox™)
- Beneficial Nematodes - Heterorhabditis bacteriophora (Cruiser™), Steinemema carpocapsae (Scanmask™)
- Fungus - Beauveria bassiana (Botanigard™, Naturalis™)
Cutworms & Armyworms

- **Lepidoptera** (Noctuid moths)
- Healthy turf can resist attack
- Larvae feed on leaves & crown
- Target young larvae in summer
- Threshold: 5 larvae/sq yd
Mites

- Banks Grass Mite
- Clover Mite
- Twospotted Spider Mite
  - Feed on leaves
  - Remove sap, chlorophyll
  - Cause speckling, silvering, bronzing
- Dry conditions, drought stress
- Spring to summer
Mite Control

- Soap (1-2%)
- Stiff stream of water; irrigate
- Miticides:
  - *Abamectin* (Advantage™, Avid™)
  - *Dicofol* (Kelthane™)
  - *Bifenthrin* (Talstar™)
- Predaceous mites
Where can you view this & other pest management slideshows?

One-stop shopping for Utah pest management information

www.utahpests.usu.edu
Dr. Erin Hodgson, USU Extension Entomologist

For sharing billbug & turfgrass research results
Contact Information

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