Turfgrass Insects & Mites

Six Steps to Effective Insect Management

1. Be sure about cause of damage
2. Identify pest & learn life cycle
3. Determine need and timing of intervention
4. Consider several management strategies
5. Implement management properly
6. Keep records and evaluate methods
• Your turf has died!
• You need new turf!
• Can you figure it out?
• What are your options in how to go about it?
• Can you get this done in a timely manner?
• Will you correctly diagnose the problem?
• Do you need a consultant to come in?
• What information do you need?
What Kinds of Information?

• About the pest
• About the conditions
• About your management options
Insect Information

• Life History Factors
  – Dispersal, Egg-laying Rate
• Last Year’s Population Densities
• Suitability for Egg-laying
• Treatments Applied
Site Information

• How Long Established
  – How many years of continuous turf?

• Adult Host Plants

• Turf Variety

• Cultural Practices

• Site History
Management Options

- Whether to treat
- When to treat
- What to use
- How to use it
Thresholds

• Aesthetic thresholds are tricky
  – Expectations of clientele
  – Weather
  – Time of year
  – Plant health VS Plant appearance
  – Other management practices
Threshold Populations - some will tolerate more damage than others!

Pest Populations & associated damage.

High

Low

Site A

Site B

Time
D. A. Potter. 1998. Destructive Turf Insects

Figure 3.10. General decision-making processes involved in integrated pest management (redrawn from Catron, 1994).
Objectives of scouting for pests

- ID target pests (what is it, numbers, growth stage, where & when)
- Locate hot spots & monitor
- Note weather conditions (daily & seasonal)
- Try and develop thresholds
- Communicate results to ????????????
- Evaluate results if action taken (numbers before and after)
Tools for scouting pest activity:

- Sharp knife
- Soil thermometer
- Cup cutter
- Hand trowel
- Dish detergent
- Hand lens (10-20x)
- Pest/disease guides
- Soil probe

- Clipboard & report forms
- “min-max” thermometer
- Shovel or spade
- Bucket
- Rating grid
- Plastic bags, bottles and ID tags

Pest Prevention Strategies

• Never see the pest controlled - never see the pest!
• “Predictive measures” based upon history and monitoring conditions
  – Best Management Practices for Turf Health
  – Includes practicing IPM
  – Chemical controls:
    • preemergence herbicides
    • preventive programs
    • treat when pest is expected/predicted in vulnerable areas
Armyworms & Cutworms = 22-30 mm (1-1.3 in.)

Sod Webworms = 20 mm (0.75 in.)
Fall Armyworm
*Spodoptera frugiperda*

a pest of all turfgrasses
most common armyworm in turf here
Grass chewed ragged & bare - likes taller turf!

D. R. Chalmers
Four black spots on each body segment

Longitudinal Stripes

Mark on Head (inverted “Y”)
Migratory Pest

• How to predict?
  – Know migratory patterns (when)
  – Know when they are expected

• Key Locations
  – FAW “may” appear in the same place every year

• Moths only fly at night -

• Armyworms lay eggs late spring to early summer about 3 generations/year
Fall Armyworm Management

Treat When Damage is First Noticed

ID and Sampling
  Soap Flush
  White Patches in Turf from Sketotinized Leaves

Biological and Cultural Practices
  BT Products - Not Effective for Larger Larvae
  Entomopathogenic Nematodes
Armyworm Management

• **Chemical Controls** - Do not irrigate after application
  – Carbaryl, Cyfluthrin, trichlorofon, lamda-cyhalothrin, permethrin, bifenthrin, halofenozide or spinosad

Always make certain that products are currently labeled for the intended application - different products are available to home consumers than professional applicators
Tropical Sod Webworm
_Herpetogramma phaeopteralis_

a major pest of St. Augustinegrass
Webworm Management

Threshold = 10 - 15 larvae / yd²

ID and Sampling - they hide during the day!
  Soap Flush
  Hands & Knees Looking for Frass and Tunnels
  Larvae Prefer Sunny Areas

Recognizing Injury
Overwintered larvae start feeding in spring and moths by early summer several generations/year (silky tubes in canopy)
Looks like Drought Injury
Small Brown Patches in Healthy Turf
General Thinning in Stressed Areas (weeds)
Webworm Management

Biological and Cultural Practices
Watering and Fertilization
BT Products - Not Effective for Larger Larvae
Entomopathogenic Nematodes
Endophyte Enhanced Varieties (cool season grasses)

Chemical Control
Larvae Nocturnal - Feed at Night
Spray in Late Afternoon
Make Sure Larvae are Active and Feeding
(Seasonal Timing Important)
Black Cutworm Management

Treatment Threshold = 3 - 8 worm / yd$^2$

ID and Sampling
- Soap Flush

Biological and Cultural Practices
- BT Products - Not Effective for Larger Larvae
- Entomopathogenic Nematodes
- Remove Grass Clippings (egg disposal)
- Short Grass has More Problems
Damage

Shiny bumps

Eggs laid on tips of leaves

D. R. Chalmers
Sample for Lawn Caterpillars
Use Liquid Dish Detergent: 1 oz / 4 gal / 4 ft²
Home consumer-type products for armyworms, cutworms, sod webworms

Trichlorfon (Bayer Advanced),
Carbaryl (Sevin),
* Bacillus thuringiensis* (BT) (Dipel WP)

Various pyrethroids (A number of pyrethroid materials are available in a variety of homeowner formulations for use as broad-spectrum contact insecticides. Commonnames include bifenthrin, cyfluthrin, cypermethrin, deltamethrin, lambda-cyhalothin, permethrin and tralomethrin. Active ingredients are listed on the label.

Tips:
Apply as a coarse spray in sufficient water for good coverage.

Always make certain that products are currently labeled for the intended application - different products are available to home consumers than professional applicators.
Other Turf Insects - Chinch Bugs

Treatment Threshold: 15 - 20 nymphs / ft²

Sampling: Floatation

Cultural: Monitor sunny areas, Endophytes, avoid high N fertilizers in Spring

Beauvaria bassiana

Beauveria bassiana is a fungus which causes a disease known as the white muscadine disease in insects. When spores of this fungus come in contact with the cuticle (skin) of susceptible insects, they germinate and grow directly through the cuticle to the inner body of their host. Here the fungus proliferates throughout the insect's body, producing toxins and draining the insect of nutrients, eventually killing it.
Chinch Bugs

- Wings Triangular mark
- Inactive winter
- Life cycle egg to adult in 7-8 weeks
- Several generations/year
- Active hot dry weather
- Sucking juice from blades injecting poison = death
- Serious on St. Aug
- Products with carbaryl, cyfluthrin or permethrin

Damage
Southern Chinch Bug (*Blissus insularis*)
A pest of St. Augustinegrass
## Home consumer-type products for chinchbugs

<table>
<thead>
<tr>
<th>Products</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>carbaryl (Sevin),</td>
<td></td>
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<tr>
<td>Imidachloprid + bifenthrin</td>
<td></td>
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<tr>
<td><strong>Pyrethroids:</strong> bifenthrin, cyfluthrin,</td>
<td></td>
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<tr>
<td><strong>Tips:</strong></td>
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<tr>
<td>Apply as a coarse spray in sufficient water for good coverage.</td>
<td></td>
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<tr>
<td><strong>Imidachloprid must be applied at or before egg hatch for best control.</strong></td>
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Always make certain that products are currently labeled for the intended application - different products are available to home consumers than professional applicators.
Mites

- Need magnifying glass to spot
- Color from white to red
- Feed on undersides of blades
- Look for webbing on plants, stunt mites are white - peel leaves from stems - look inside sheaths
- Active anytime during growing season
- Yellow patchy grass thins & browns off but close up finds yellow specks on blades
- Mites on all grasses - stunt mites only on buffalograss and bermudagrass
- Keep grass healthy Treat with miticides (such as dicofol or fluvanate). Insecticides soaps may help with stunt mites (with enough water)
Eriophyes cynodoniensis
(Bermudagrass mite)
On Cynodon
Zoysiagrass Mite

*Eriophyes zoysiae*
Rhodesgrass mealybug *Antonina graminis*

Globular dark purplish brown covered with white cottony secretion

Adults 1/8 inch diameter

5 generations each year - may be problem (bermuda & St. Aug)

- Plants turn brown & die
- Attacks crowns - sucking insect
- Harder to control than chinchbugs
Odonaspis ruthae
(Bermudagrass Scale On Bermudagrass)
Billbugs: *Sphenophorus* spp.
- Hunting billbug
- Bluegrass billbug
- Denver billbug
- Phoenix billbug
Hunting Billbugs

- Larvae are white legless grubs
- Adults brownish gray long snouts
- May be found as adult all year long
- Lay eggs on grass stems esp. early spring
- Larvae feed on stems then drop to ground to feed on roots/stolons
- Bermudagrass & zoysiagrass preferred

✓ Chemical control = Imidacloprid or bifenthrin

Always make certain that products are currently labeled for the intended application - different products are available to home consumers than professional applicators
White Grub Complex

• Different Life Histories
  – timing of applications
  – method of application

• Different Threshold Levels

• Different Treatment Options
Identify larvae of white grubs by examining the arrangement of hairs (seta) at the base of the abdomen.
June & May Beetles
*Phyllophaga* spp.
Preventive Treatments

• Areas Where Grubs Always Occur
• Areas Where Heavy Adult Activity Has Been Seen
• “Longer-lasting” Pesticides: Imidichloprid (Merit), Halofenozide (Mach 2)

Always make certain that products are currently labeled for the intended application - different products are available to home consumers than professional applicators

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Preventive Control

• Longer soil residual products
• Meant to be applied before grub problem develops.
• Most suited for high-risk sites with a history of grub problems,
• Where heavy beetle activity was noted.
Chemical Products for Preventive Control
Imidacloprid (Merit)

- Effective against young, newly hatched grubs.
- Applied between May 15 and mid July
- Optimum treatment period is mid June to mid-July.
- Ineffective as curative treatment against large grubs.

Always make certain that products are currently labeled for the intended application - different products are available to home consumers than professional applicators.
Products for Preventive Control - Halofenozide (Mach 2 or GrubX)

✓ Effective against young grubs.

• Timing is the same as for Merit

✓ May be used for early curative control although is slower and generally less effective than trichlorfon against large grubs.

Always make certain that products are currently labeled for the intended application - different products are available to home consumers than professional applicators.

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Biologicals: Preventive Control
Milky disease (*Bacillus popilliae*) Milky Spore Powder

✓ Poor performance in Kentucky field trials and VT lab trials
  • Labeled for Japanese Beetles only

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Curative Control

• Normally applied in August or September
  – after the eggs have hatched and grubs are present.

• Applied when grub density will potentially cause visible damage to turf
  – exceeds threshold
Curative Treatments

- Sample area in Zig-Zag pattern in sunny areas, areas near street lights for nocturnal adults, near adult food plants.
- 95% of Material Applied Ends Up in Thatch
- Reduce Thatch to Less than 1 inch or Insecticides will not reach Insects
- Return Clippings to Turf for 1 or 2 Mowings
- Re-sample Before 30 Days After Treatment
- Smaller Grubs are Easiest to Kill
Home consumer-type products for grub control

White grubs (Japanese beetle larva, European chafer, Southern chafer, May beetle, June beetle, Billbugs)

- trichlorfon (Bayer Advanced),
- Imidaclorpid (Merit)
- carbaryl (Sevin),
- halofenozide (Grub-B-Gon, GrubX, Mach 2)

Tips:

- Best results can be expected if early instars (smaller grubs) are treated.
- Water lawn before application of any control material.
- Water thoroughly following insecticide application.
- In areas with historical grub infestations, preventive treatments of imidaclorpid or halofenozide provide excellent control of young grubs

Always make certain that products are currently labeled for the intended application - different products are available to home consumers than professional applicators
Biologicals for Curative Control
White grubs (Japanese beetle larva, European chafer, Southern chafer, May beetle, June beetle, Billbugs)

Fungal disease (*Beauveria bassiana*)

“Beneficial” Entomopathogenic nematodes (*Steinernema carpocapsae, S. glaseri, Heterorhabditis bacteriophora*) -
Require moist conditions for good performance; Do not apply to dry turf; Inconsistent results

Always make certain that products are currently labeled for the intended application - different products are available to home consumers than professional applicators
Mole Crickets

Southern

Tawny
Mole Cricket damage in Bermudagrass

Tunneling Damage
Ground Pearls
Margarodes meridionalis
Eumargarodes laingi

✓ Scales that feed on roots
✓ Hard waxy shell 1/8 inch dia
✓ Feed, grasses yellow & die
✓ Spring damage & dry periods
✓ Bermuda & Centipede
✓ Possible Zoysia & St. Aug.
✓ No chemical control!!!
Prospects For Managing Turf Insects without Protective Chemicals

**IPM Program**

**Insects**
Sampling, Monitoring, Risk Assessment
Cultural Control
Host Plant Resistance
Biological Control
Biological Insecticides
Pathogenic Microbes (Entomopathogenic Nematodes, Insect-Pathogenic Bacteria, Insect-Pathogenic Fungi, Insect-pathogenic Viruses)
Microbial Derivatives (*Baccillus thuringiensis (Bt)*, *Spinosad*)
Reduced Risk Chemistry

**Goal** = Effective & Less Plant Protective Chemicals Used

Site Information

- How Long Established
  - How many years of continuous turf?
- Adult Host Plants
- Turf Variety
- Cultural Practices
- Site History
Common Reasons for Insecticide Failures

• **Enhanced Biodegradation** - Use of the same material year after year builds up microbial populations that degrade it

• **Tank Hydrolysis** - Mixing chemicals with acidic or basic water and leaving tank mixes for too long

• **Improper Calibration or Poorly Maintained Equipment** - Wrong Rates!
More Common Reasons for Insecticide Failures

• **Improper Irrigation** - Read labels of materials to determine when and how much to irrigate

• **Improper Timing** - Make sure the insects are present, susceptible and causing the damage

• **True Insecticide Failure** - If all else is ruled out, contact manufacturer
What References Are On Your Desk?

www.cdms.net
www.weedalert.com
Other web sites…