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

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- 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?

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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

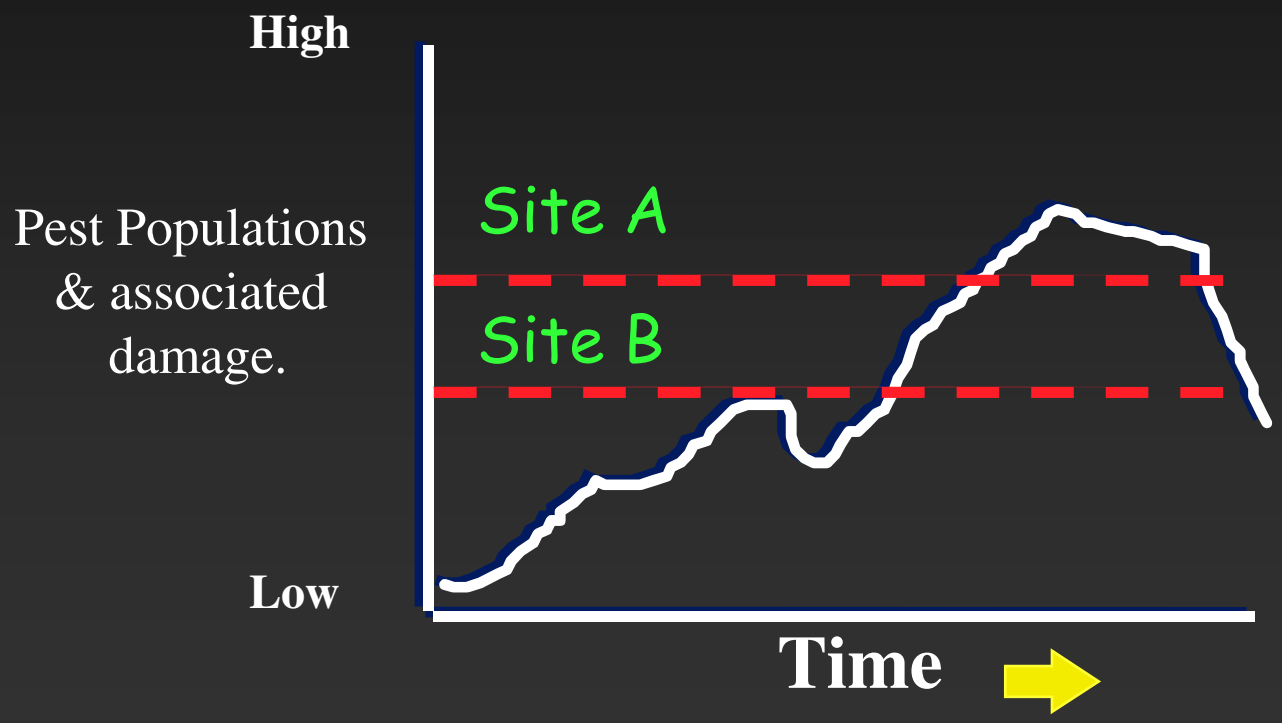
Management Options

- 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!



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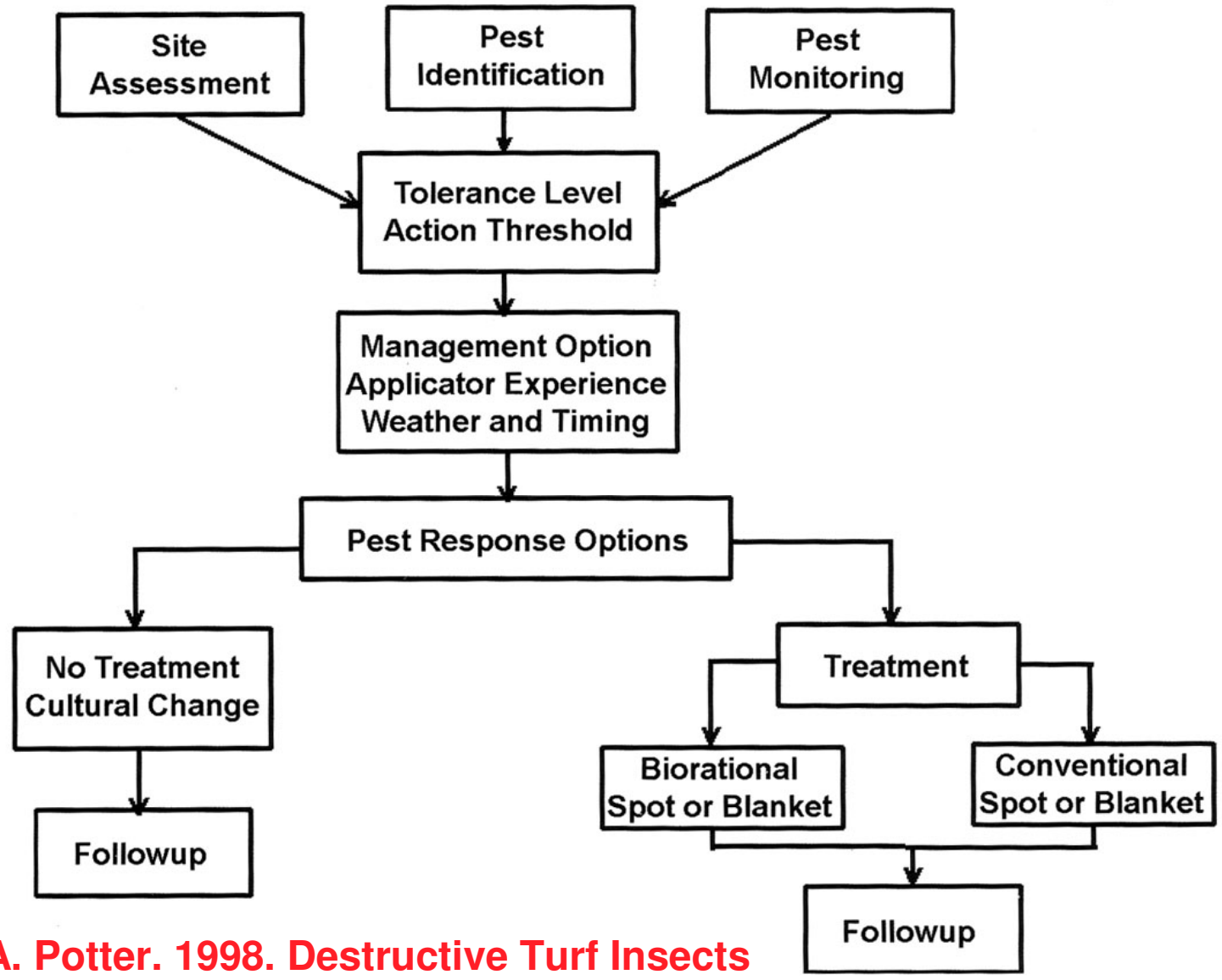


D. A. Potter. 1998. Destructive Turf Insects

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)

G. Schumann, P. Vittum, M. Elliott & P. Cobb, 1997. IPM Handbook

Tools for scouting pest activity:

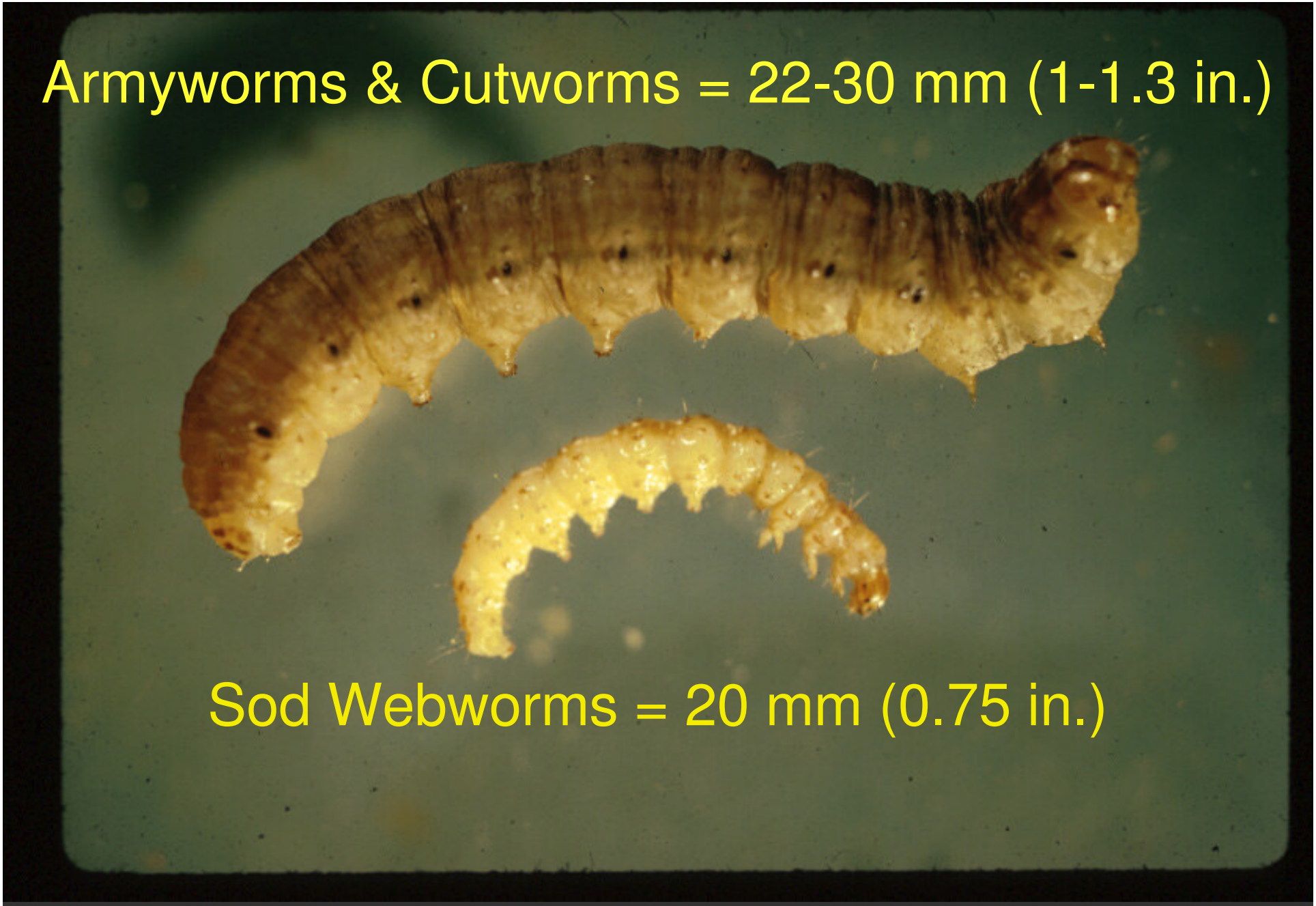
- ✓ Sharp knife
- ✓ Soil thermometer
- ✓ Cup cutter
- ✓ Hand trowel
- ✓ Dish detergent
- ✓ Hand lens (10-20x)
- ✓ Pest/disease guides
- ✓ Soil probe

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

G. Schumann, P. Vittum, M. Elliott & P. Cobb, 1997. IPM Handbook

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!

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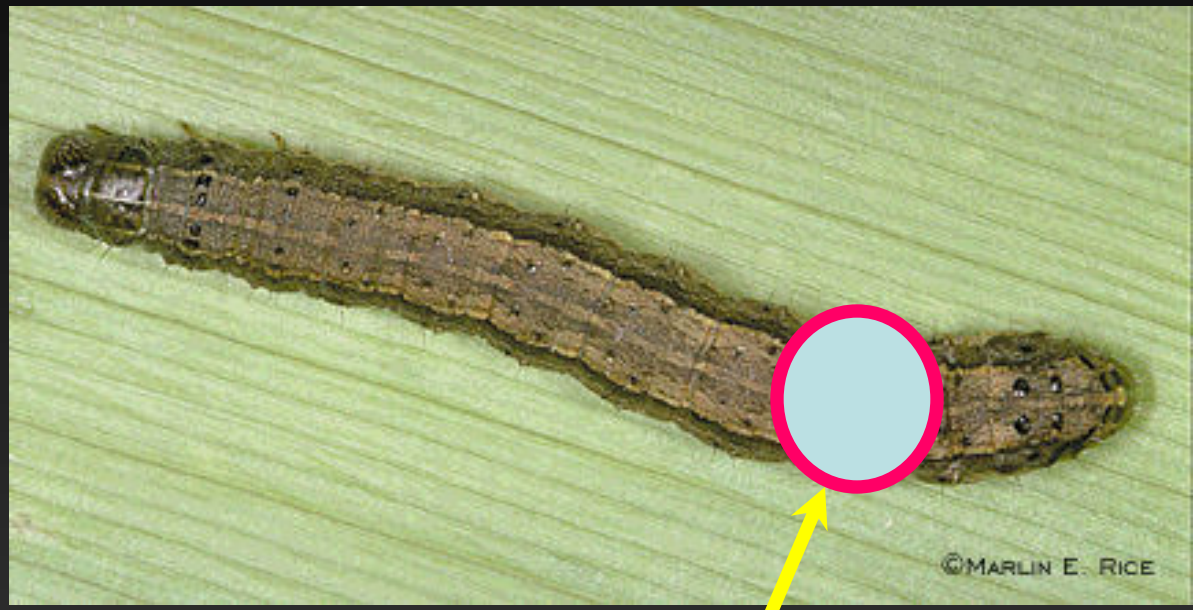
Mark on Head (inverted "Y")



Longitudinal Stripes

Four black spots on each body segment

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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

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Webworm Management

Threshold = 10 - 15 larvae / yd^2

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)

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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

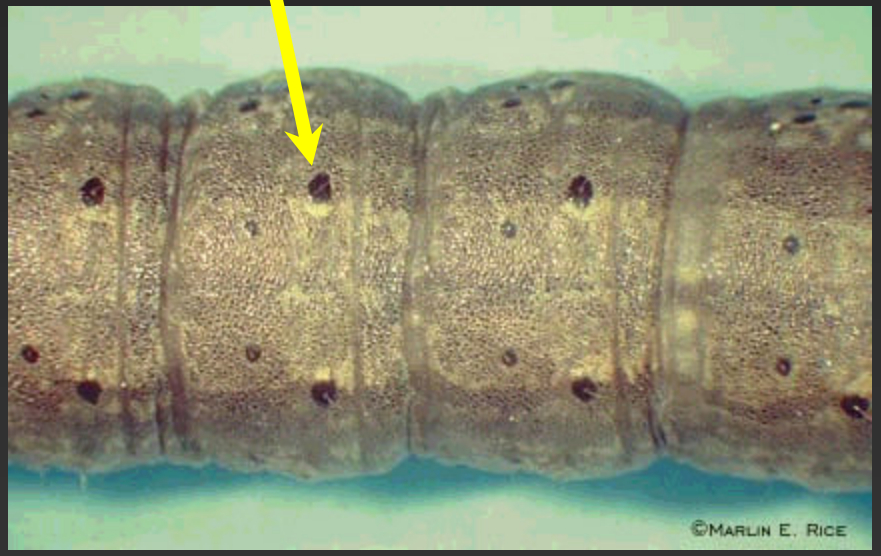
Entomopathogenic Nematodes

Remove Grass Clippings (egg disposal)

Short Grass has More Problems

Damage

Shiny bumps



Eggs laid on tips of leaves

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Sample for Lawn Caterpillars
Use Liquid Dish Detergent: 1 oz / 4 gal / 4 ft^2

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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 / ft^2

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, cyfluthin or permethrin

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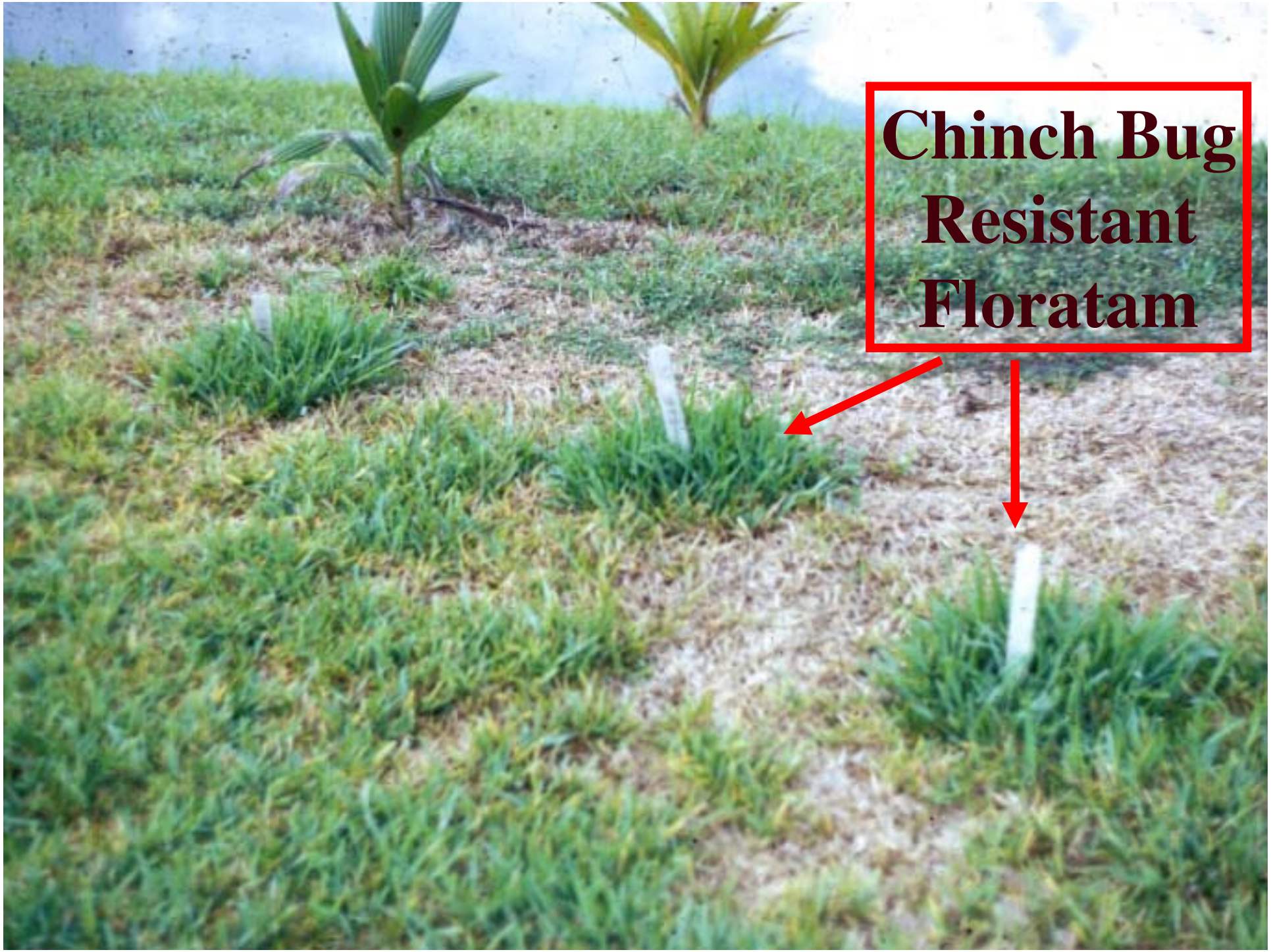
Southern Chinch Bug (*Blissus insularis*)
A pest of St. Augustinegrass


Chinch Bug
Resistant
Floratam

Home consumer-type products for chinchbugs

carbaryl (Sevin),

Imidachloprid + bifenthrin

Pyrethroids: bifenthrin, cyfluthrin,

Tips:

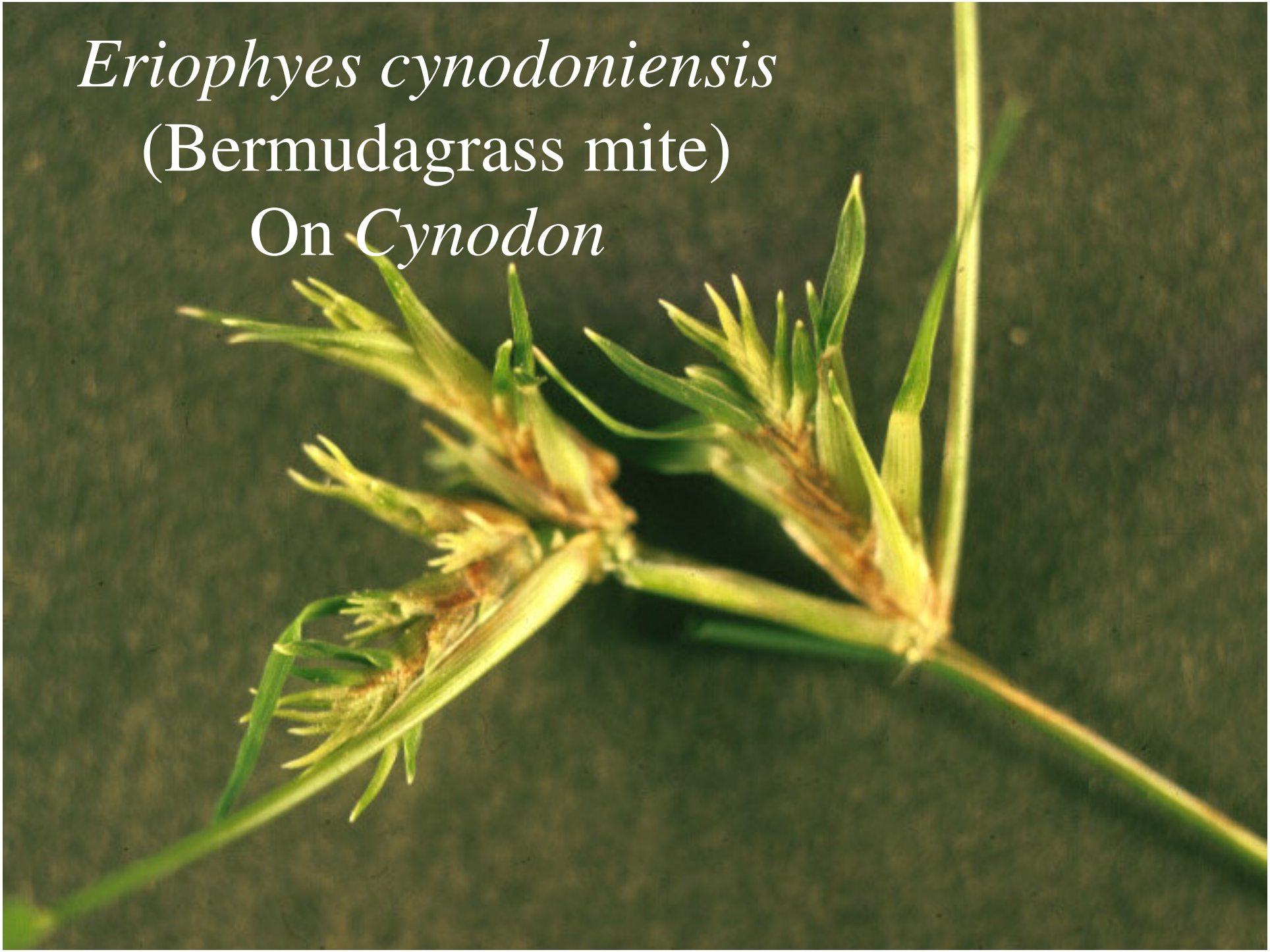
Apply as a coarse spray in sufficient water for good coverage.

Imidachloprid must be applied at or before egg hatch for best control.

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 mitacides (such as dicofol or fluvanate). Insectides soaps may help with stunt mites (with enough water)


Eriophyes cynodoniensis
(Bermudagrass mite)
On *Cynodon*

Zoysiagrass Mite

Eriophyes zoysiae

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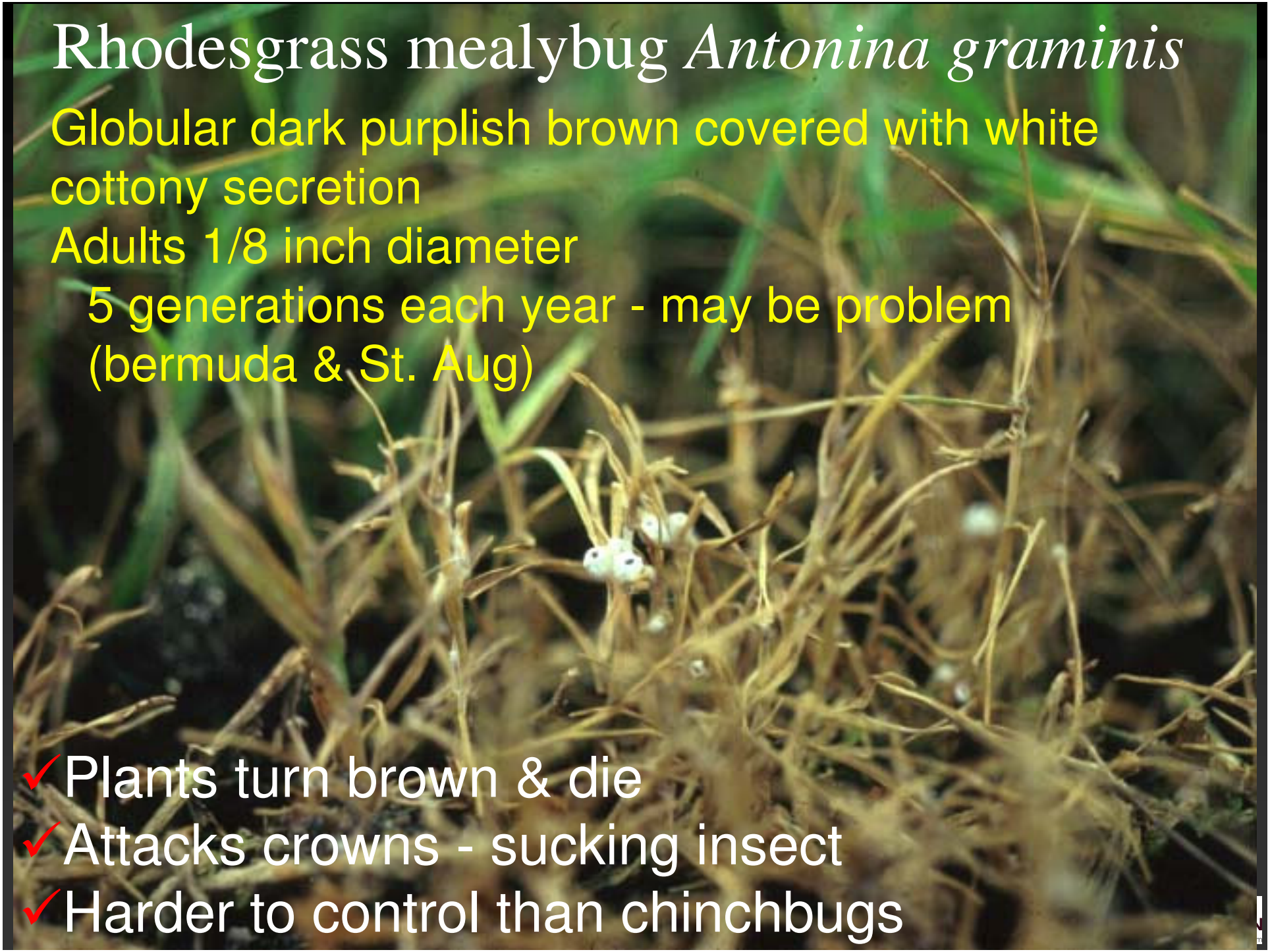
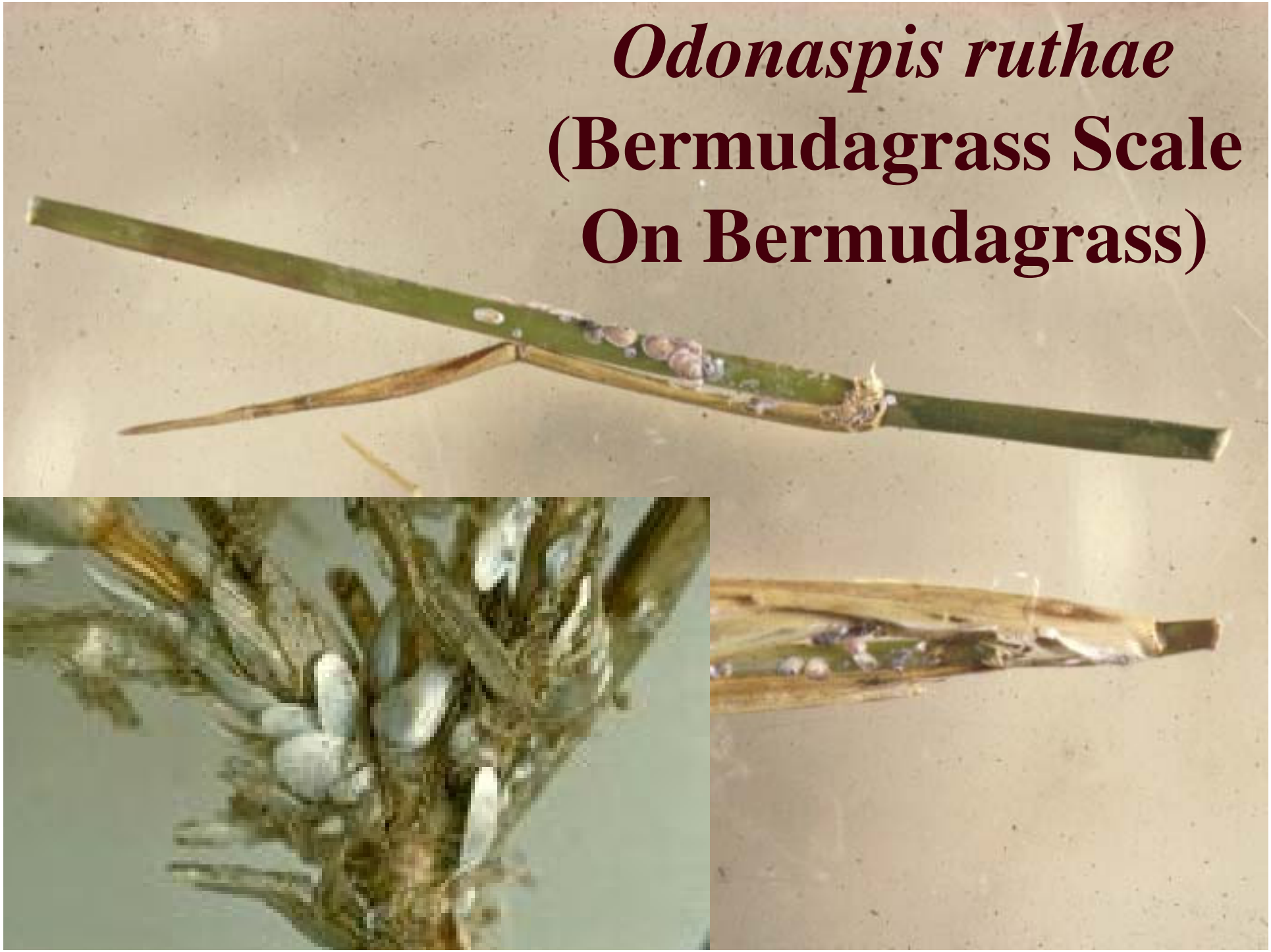

Rhodesgrass mealybug *Antonina graminis*
Globular dark purplish brown covered with white cottony secretion
Adults 1/8 inch diameter
5 generations each year - may be problem (bermuda & St. Aug)
✓Plants turn brown & die
✓Attacks crowns - sucking insect
✓Harder to control than chinchbugs

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

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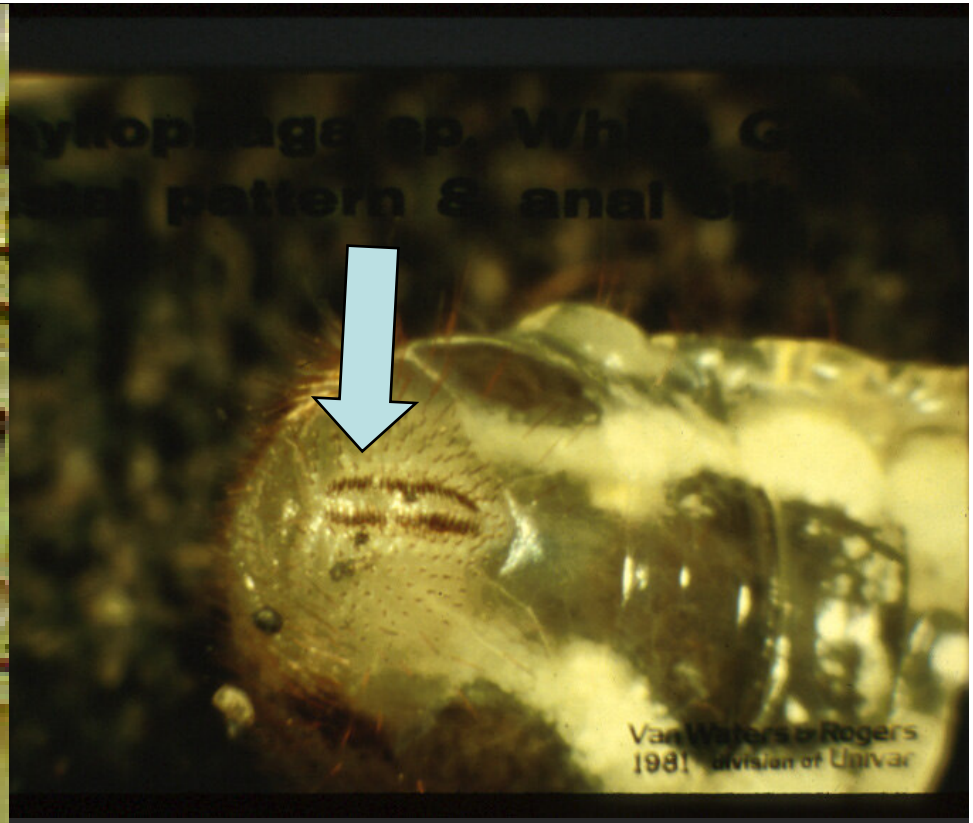
White Grub Complex

- 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

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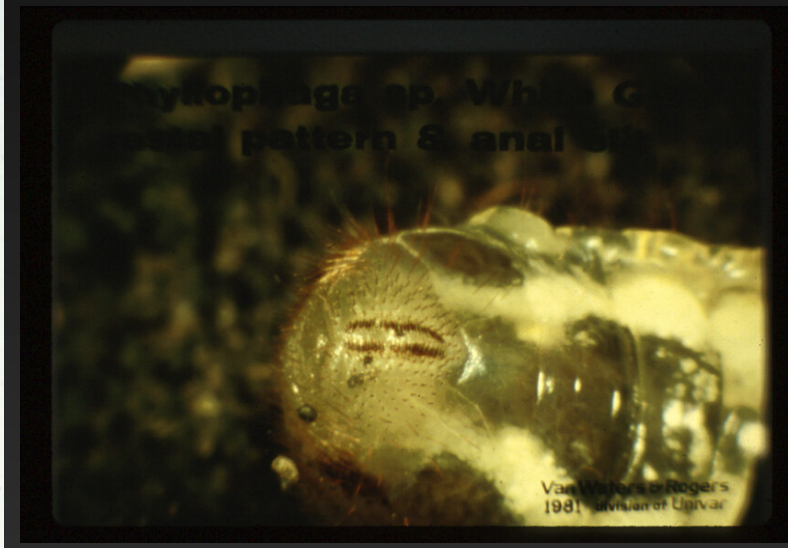
June & May Beetles
Phyllophaga spp.



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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

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
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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

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

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

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),

Imidacloprid (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 imidacloprid or halofenozide provide excellent control of young grubs

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Biologicals for Curative Control

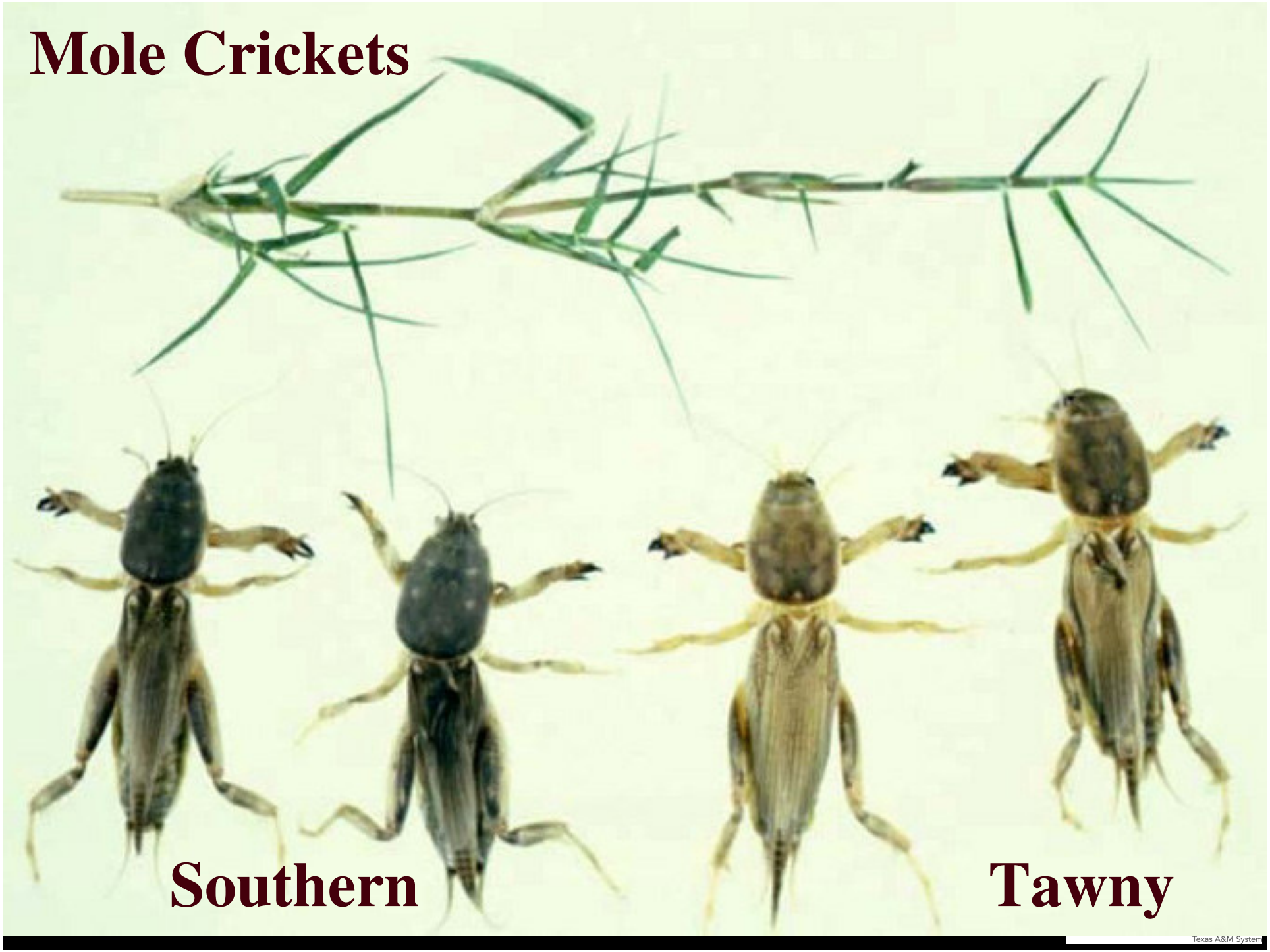
White grubs (Japanese beetle larva, European chafer, Southern chafer, May beetle, June beetle, Billbugs)

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!!!

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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

D. A. Potter. 2005. ITS Res. Journal 10:42-51

Site Information

- How Long Established
  - How many years of continuous turf?
- Adult Host Plants
- Turf Variety
- Cultural Practices
- Site History

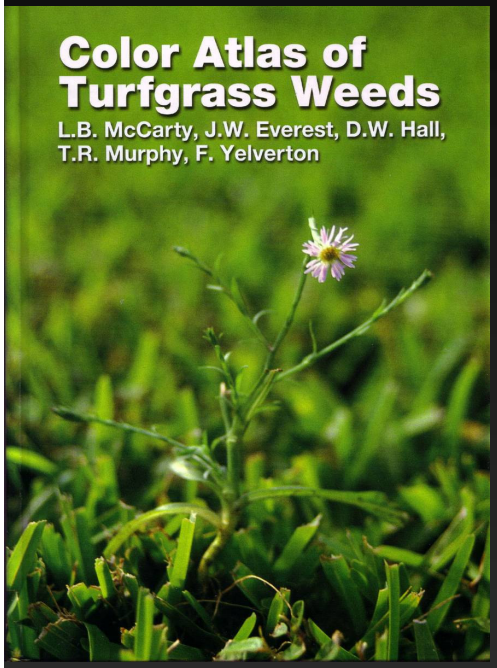
Common Reasons for Insecticide Failures

- 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

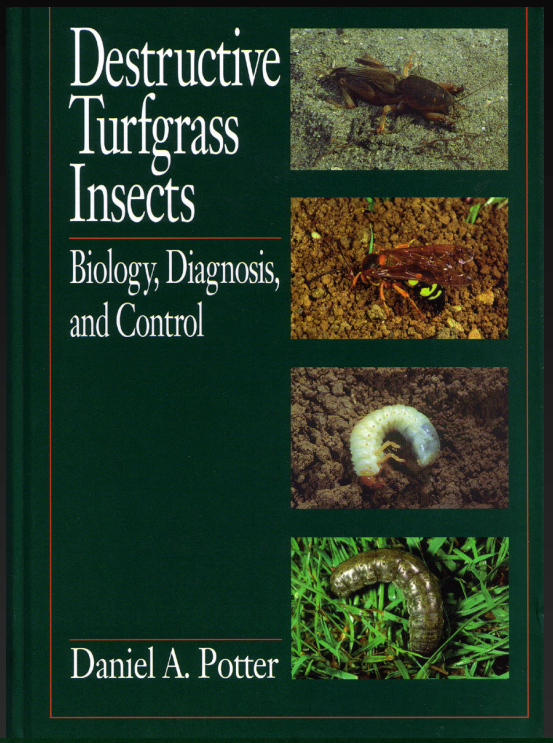
What References Are On Your Desk?

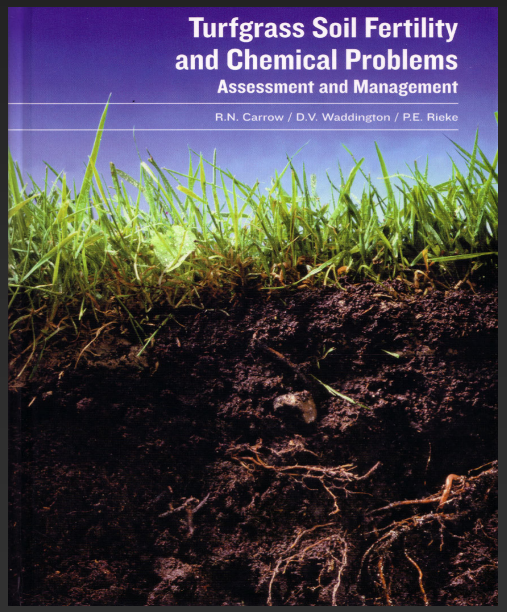


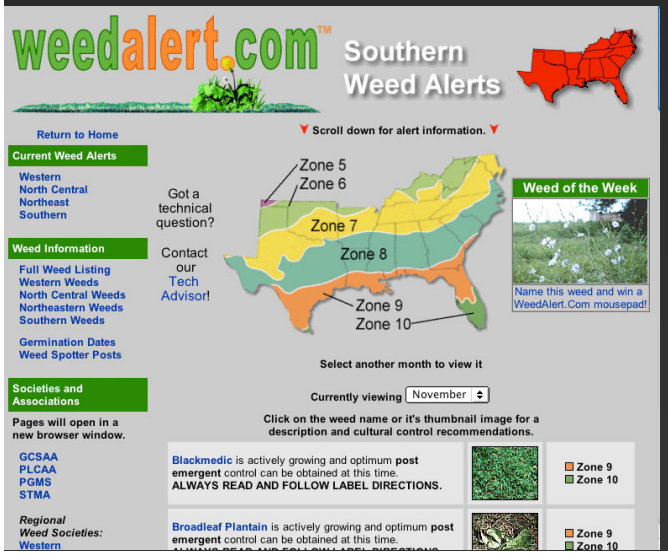
www. cdms.net

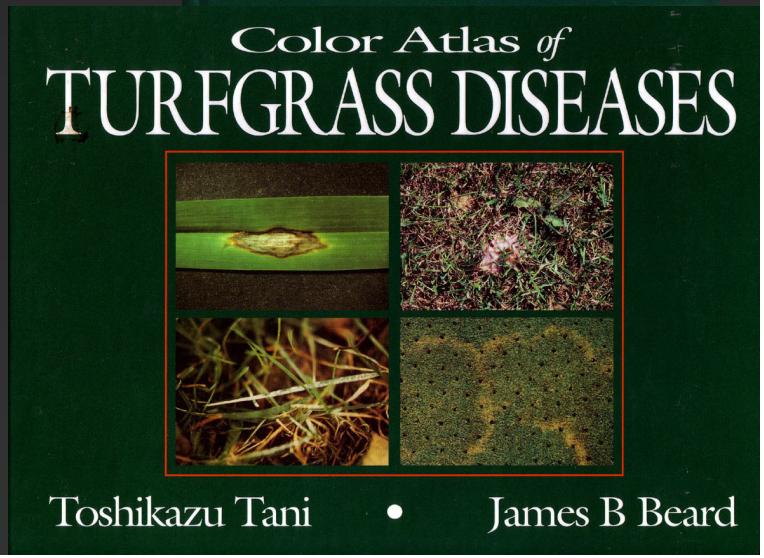
www.weedalert.com

Other web sites…









Integrated Pest Management References