Updates on Insect Pests of Turfgrass

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Arthropod pests

- Caterpillar pests – sod webworm/fall armyworm
- Rhonesgrass mealybug
- Southern chinch bug
- Billbugs
- Mole cricket

Sod webworm

- Iver-striped sod webworm *Fissicrambus mutabilis*
- Bluegrass sod webworm *Parapediasia teterrella*
- The larger sod webworm *Pediasia trisecta*

Biology

- Overwinter as mature larvae in silken tunnels
- Moth: zigzag flight over the turfgrass at dusk
- Drops eggs during the flight
- Female lays ~200 eggs
- Larvae feed on leaf blades in night
- Larvae molt 6 to 10 times
- Pupae: soil, debris

Sod webworm management

- Numerous predators, especially ants
- Peak egg hatch two weeks after moth flight
- Treat in late afternoon
- Pyrethroids, neonicotinoids, diamide
- Cut the grass before treatment

Fall armyworm

Fall armyworm

- Favor hot and dry conditions
- Problem in late summer to fall
- Active during night and attracted to light
- Egg masses on structures in the golf courses
- >50 egg masses per female
- Complete a generation in a month in August and Sept.

Photo credit: Rob Wolverton

Photo credit: Rob Wolverton


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UGA167

Caterpillar Control

- Orthene
- Talstar
- Sevin
- Acelepryn
- Tempo
- DeltaGard
- Mach 2
- Conserve
- Dylox
- Scimitar
- Acephate
- Bifenthrin
- Carbaryl
- Chlorantraniliprole
- Cyfluthrin
- Deltamethrin
- Halofenozide
- Spinosad
- Trichlorfon
- Lambda-cyhalothrin

Rhodesgrass mealybug

(*Antonina graminis*)

Rhodesgrass mealybug

- Invasive insect to Asia: found in 1942 in Texas
- Infest >100 grass hosts (Family Gramineae)
- Pastures and turfgrass
- Bermudagrass, St. Augustinegrass, rhodesgrass, and Johnsongrass, buffalograss, tall fescue, centipedegrass, bahiagrass, and zoysiagrass
- High numbers of mealybugs on ‘TifEagle’ and ‘Tifway’

Chada and Wood 1960, Baxendale and Shetlar 1995, Helms and Vinson 2000, Reihert and Chada 1952, Vittum et al. 1999

Biology

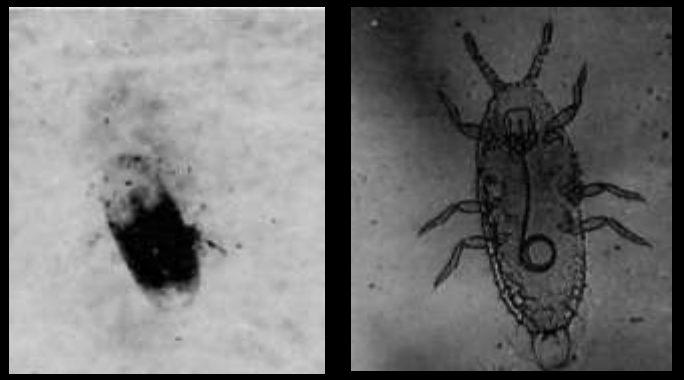
- Adults are dark red or purple colored
- 150-200 eggs retained in the adult until ready to hatch
- Reproduces parthenogenetically – no mating required – all are females
- Males are winged fly-like appearance
- Adult reproduces throughout the year: > 59°F; no winter diapause reported

Nymphs insert feeding tube to phloem

(Chada and Wood 1960)

Biology

- First stage nymphs are mobile and settle on the grass nodes; > 50 nymphs per node
- Dispersed by wind and human movement (along road or rail)
- Then second instar nymph develops into a sac – not mobile, drops all legs
- Three larval stages
- Nymphs mature in ~2 months



Crawler

Developing nymphs

(Chada and Wood 1960)

Excreta

- Honeydew: Hollow waxy filament (~1 inch)
- Filament carries waste away from insect and reduces contamination
- A spherical, translucent droplet which bursts into a fine spray
- Ants and bees are attracted to honeydew and provide protection

Longevity and environmental conditions

- Adults live ~ 3.5 months
- Adults dies after egg laying
- Good at high temperatures but not for longer time – fecundity and survival reduces
- 100% adult mortality at 106^{o}F for 2 days
- Survives freezing conditions but the reproductive activity reduces
- Without feeding:
  5 days for nymphs
  6 weeks for adults

Settles in the stem nodes under the leave sheath


Initially: Yellow and stunting as if drought stressed
Longer term: Brown and grass dies

Susceptible cultivars

- Most susceptibility: Kikuyugrass and bermudagrass
- Bermudagrass: TifSport, Tifway, Celebration, Premier, Tifton-10
- Intermediate susceptibility: St. Augustinegrass, buffalograss, and zoysiagrass
- Resistant: Centipedegrass, seashore paspalum, bahiagrass, or tall fescue

(Reinert and Vinson 2010)

Biological control

- Five parasitic wasps to TX and FL in 1950s:
  - *Anagyrus antoninae* from Hawaii
  - *Pseudectroma europaea, Xanthoencyrtus phragmitis*, and *Boucekiella antoninae* from France
  - *Neodusmetia sangwani* from India

Established

- Rhodesgrass mealybug populations reduced 68.8% (Texas), and 50 to 83% (Rio Grande Valley) by *N. sangwani* parasitization

(Schuster and Boling 1971, Schuster and Dean 1976)

Parasitoid survey 2005

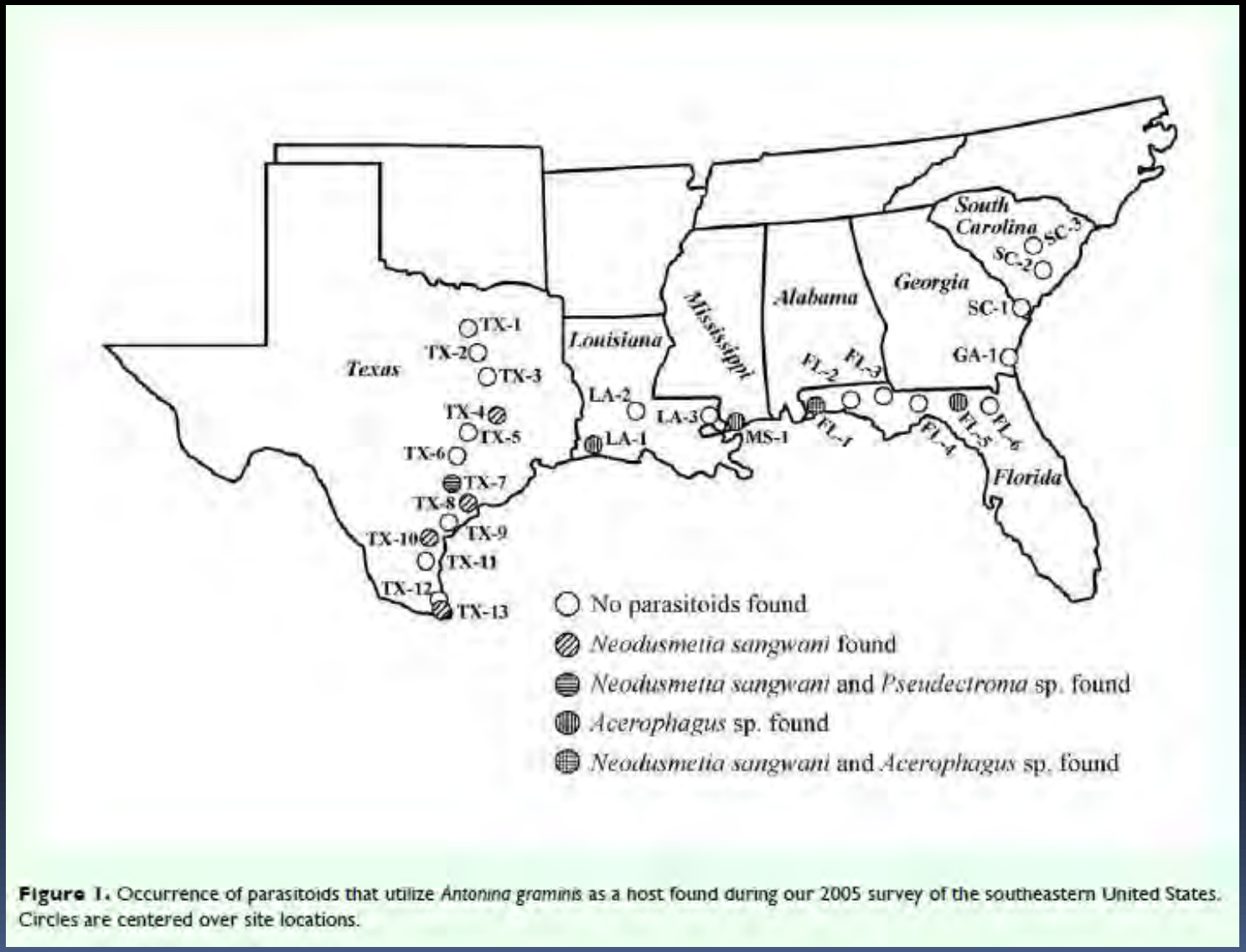


Figure 1. Occurrence of parasitoids that utilize *Antonina graminis* as a host found during our 2005 survey of the southeastern United States. Circles are centered over site locations.

(Chantos et al. 2009)

Re-emergence as pest?

- Mutualistic relationship with the red imported fire ant

(Helms and Vinson 2003, Chantos et al. 2008)

Chemical option

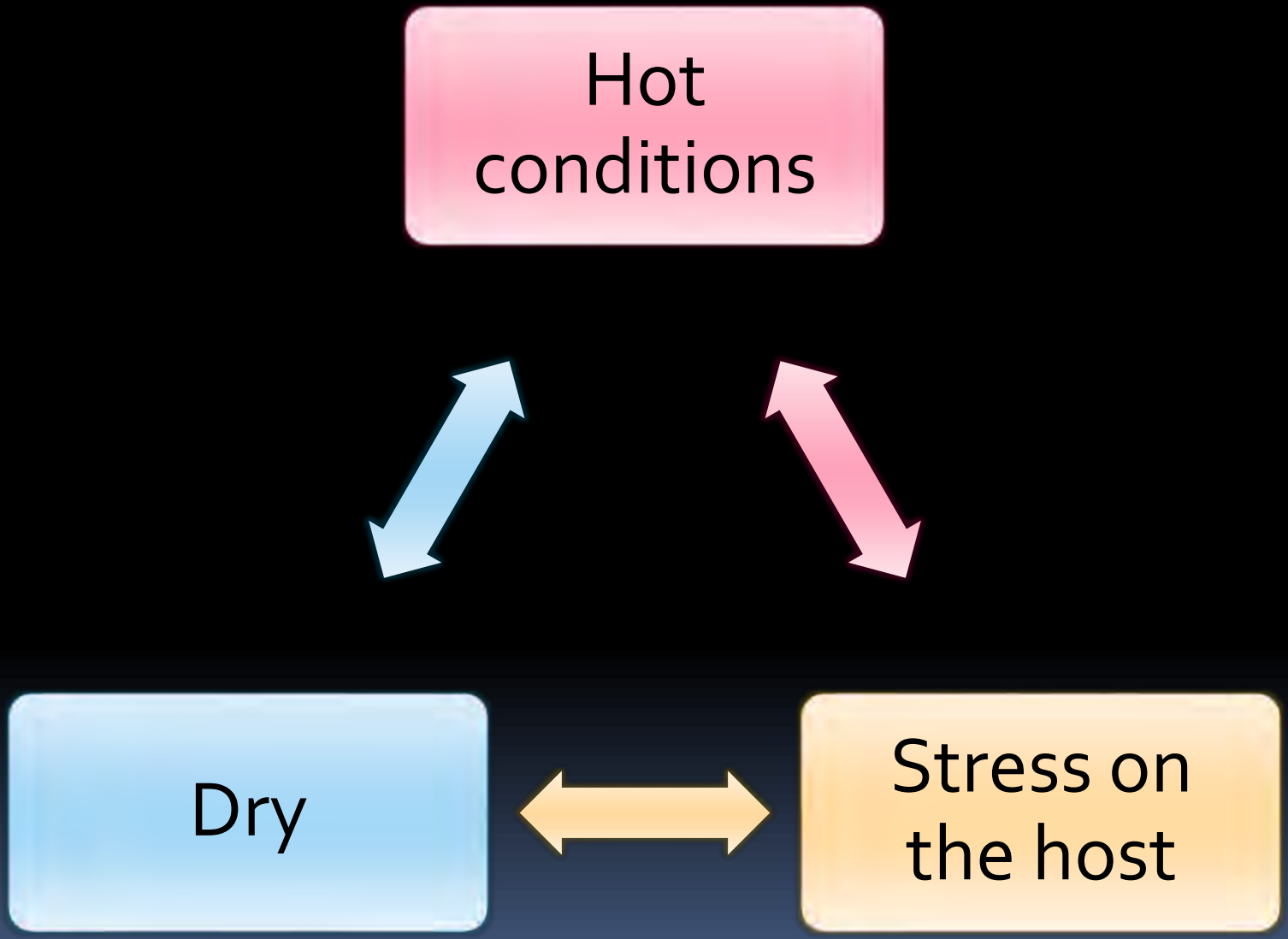
- Limited insecticide efficacy data exists against rhodesgrass mealybug

Brand name	Chemical	System
Allectus GS SC	bifenthrin + imidacloprid	Turfgrass, golf, sod
Merit 75WSP	imidacloprid	Turfgrass, golf, sod
Zylam	dinotefuran	Turfgrass, golf, sod, municipal and residential
Telstar EZ	bifenthrin	Turfgrass, municipal and residential
Tempo	cyfluthrin	Turfgrass, municipal and residential

- Add surfactant with spray application

Southern chinch bug

Blissus insularis


Hot conditions
Dry
Stress on the host

Chinch bug control

- Acephate
- Bifenthrin
- Clothianidin
- Cyfluthrin
- Deltamethrin
- Imidacloprid+ bifenthrin
- Carbaryl
- Lambda-cyhalothrin
- Orthene
- Talstar
- Arena
- Tempo
- DeltaGard
- Allectus
- Sevin
- Scimitar

Billbugs
(*Sphenophorus spp*)

Photo credit: Rob Wolverton

Hunting billbug life cycle

http://www.turffiles.ncsu.edu/alerts/insects/hunting-billbug-adults-increasing-in-number-and-activity

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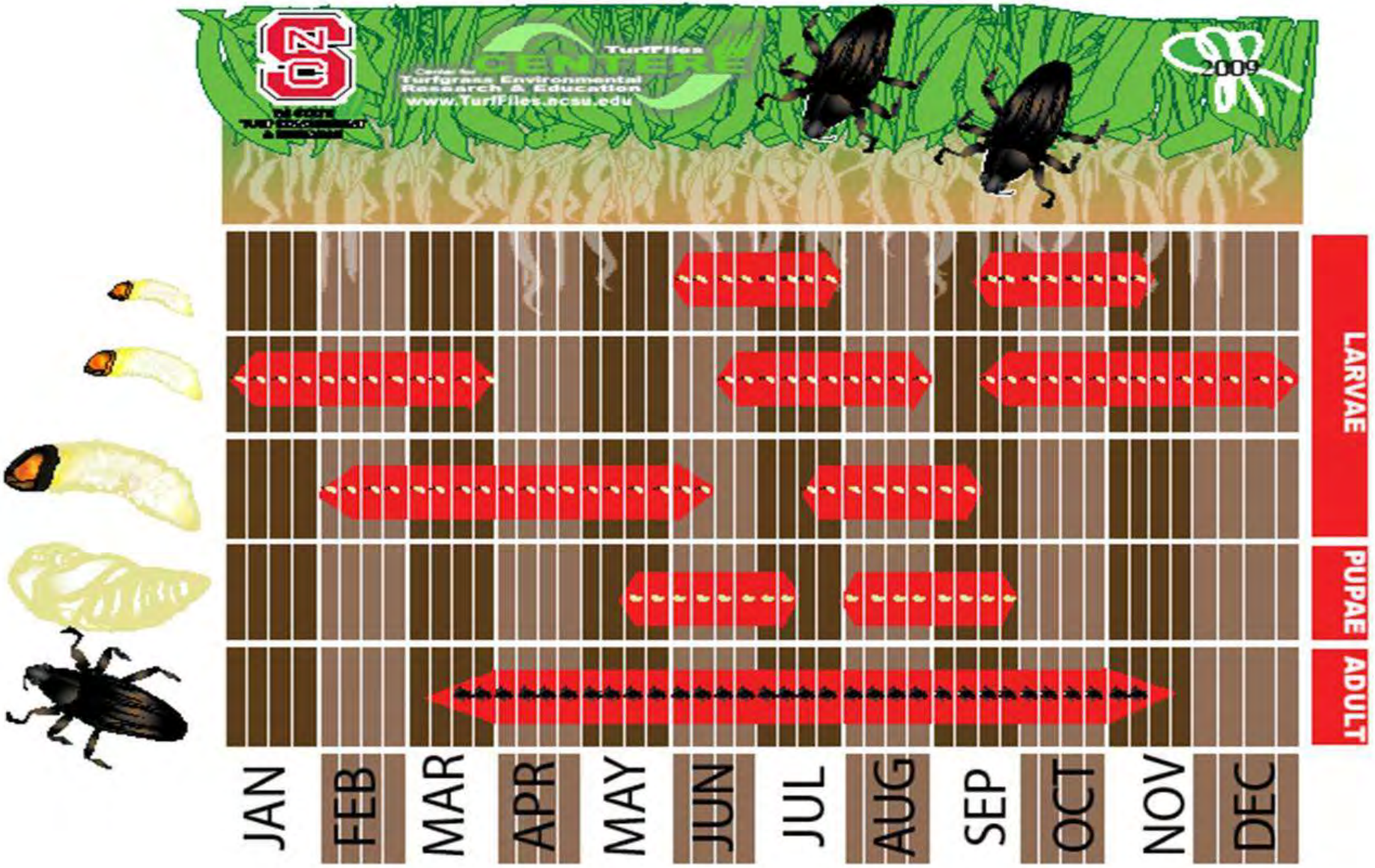
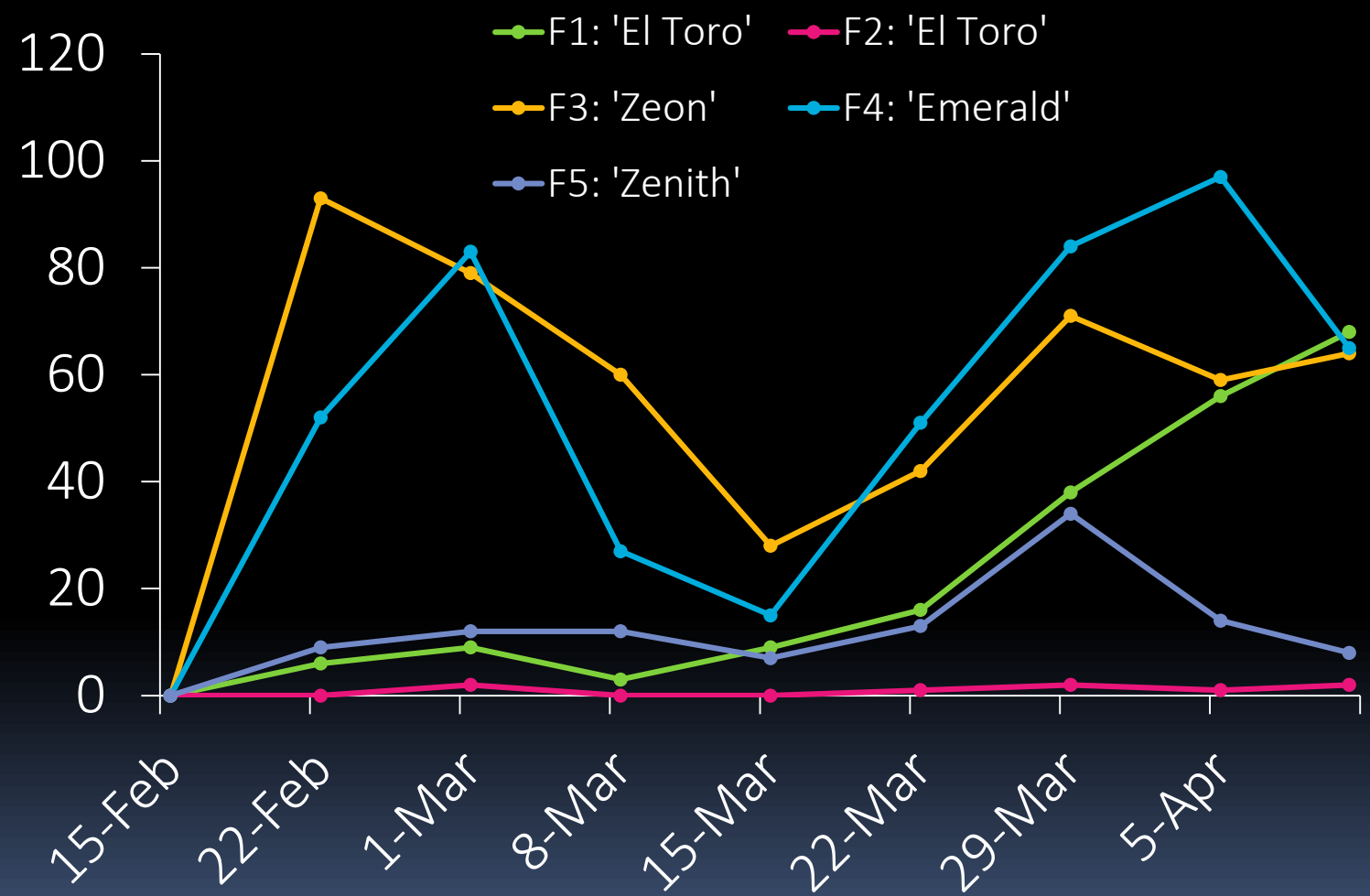
Hunting billbug phenology



Billbug phenology in GA

Billbug phenology in GA

Number of adult billbugs



Billbug biology

- Eggs in the stolon of the grass after make a hole
- First instar feeds within stolon
- 2-3 instars in soil feed on roots

https://pnwhandbooks.org/insect/hort/turfgrass/turfgrass-billbug

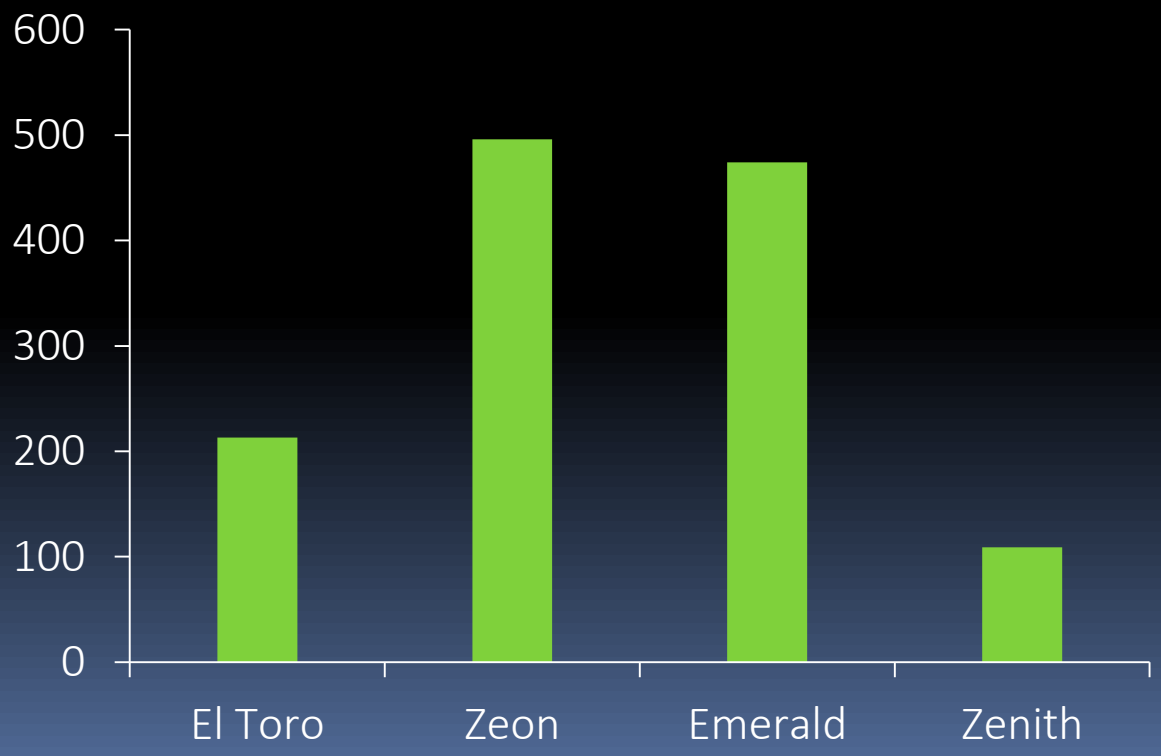
Hunting billbug damage

http://www.turffiles.ncsu.edu/alerts/insects/hunting-billbug-adults-increasing-in-number-and-activity

Hunting billbug management - Cultural

- Zoysiagrass (*Z. matrello*): Diamond, Zorro, Cavalier, Royal, Zeon, Emerald
- Bermudagrass: TifEagle

Huang and Buss 2013



Hunting billbug management

- Adult:
  - bifenthrin (Talstar, Menace)
  - deltamethrin (Deltagard)
  - lambda-cyhalothrin (Scimitar or Battle)
  - imidacloprid (Merit)
- Larvae:
  - clothianidin (Arena)
  - thiamethoxam (Meridian)
- Adult and larvae:
  - chlorantraniliprole (Acelepryn)
  - clothianidin + bifenthrin (Aloft)
  - imidacloprid + bifenthrin (Allectus, Atera)

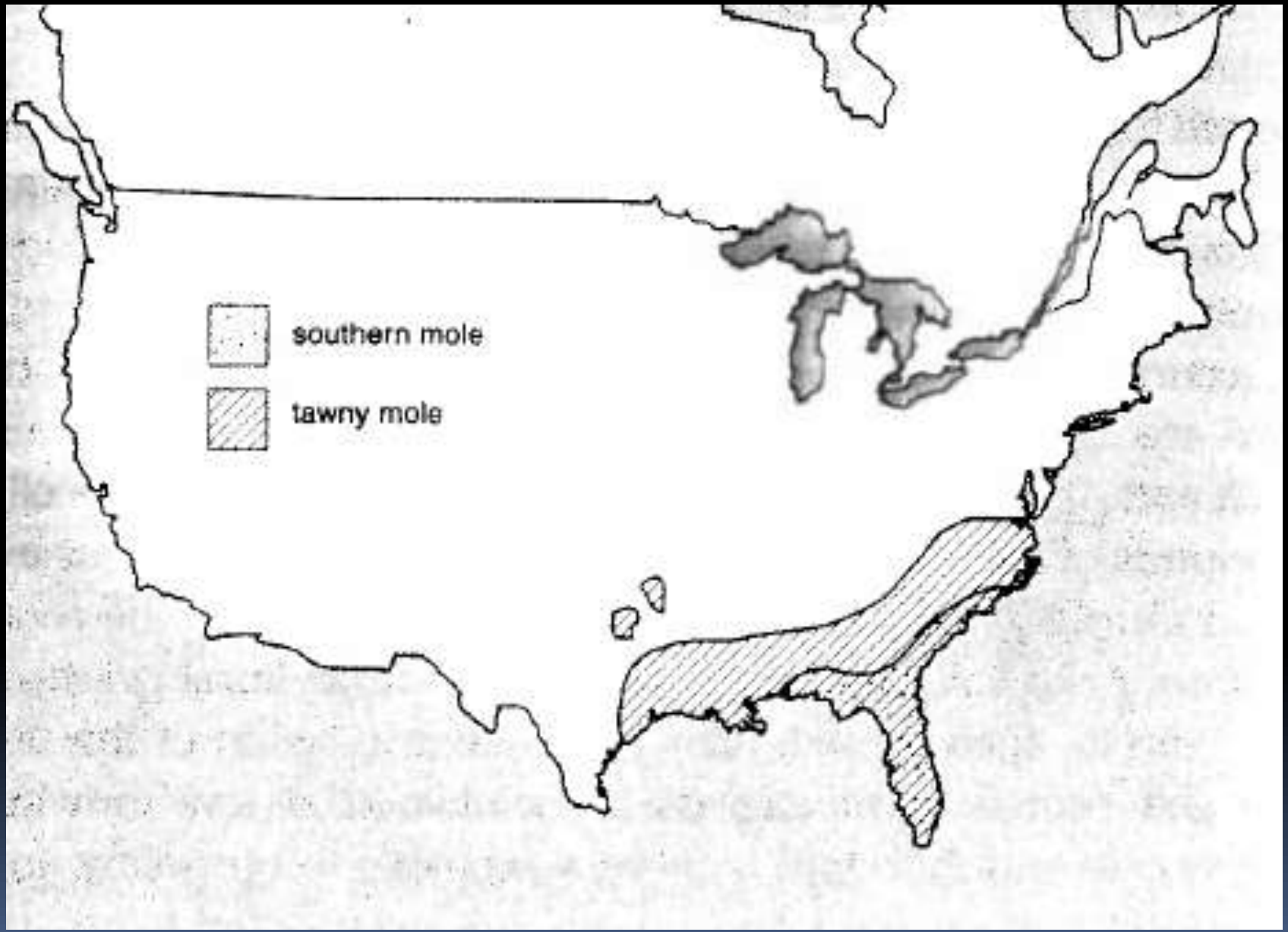
Hunting billbug management

- Preventative applications in spring
- Billbugs are active at night
- Water-in the insecticides after application
- Biological control: *Steinernema carpocapsae*
  S. feltiae
  Heterorhabditis bacteriophora
- Fungal entomopathogens are not proved effective

Mole cricket

- Two pest species —

1. Tawny mole cricket (*Scapteriscus vicinus*)
2. Southern mole cricket (*S. borellii*)
3. Short-winged mole cricket (*S. abbreviatus*)

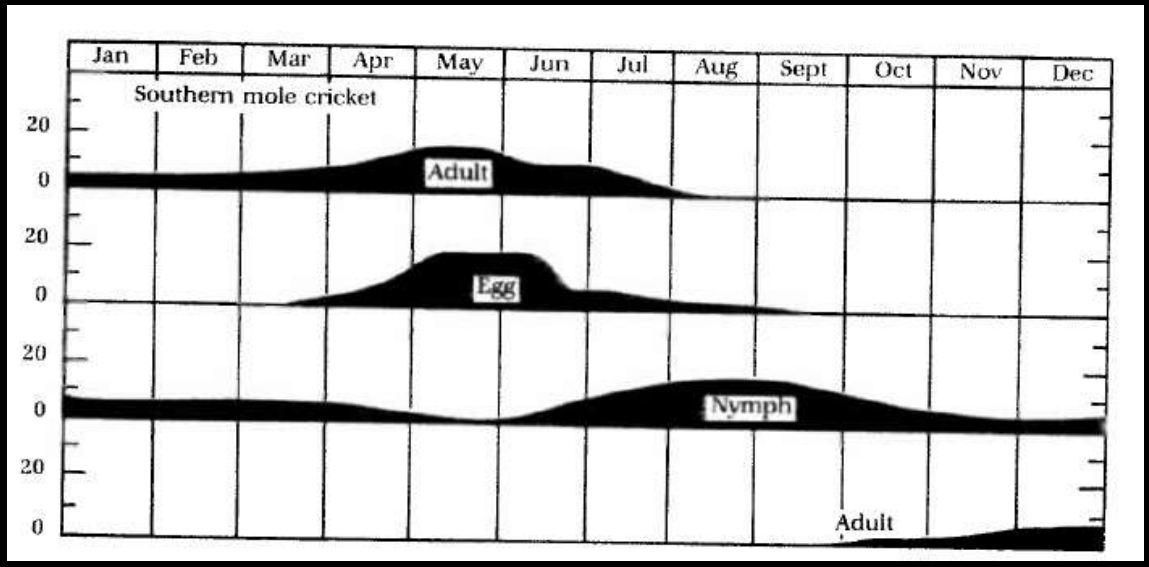


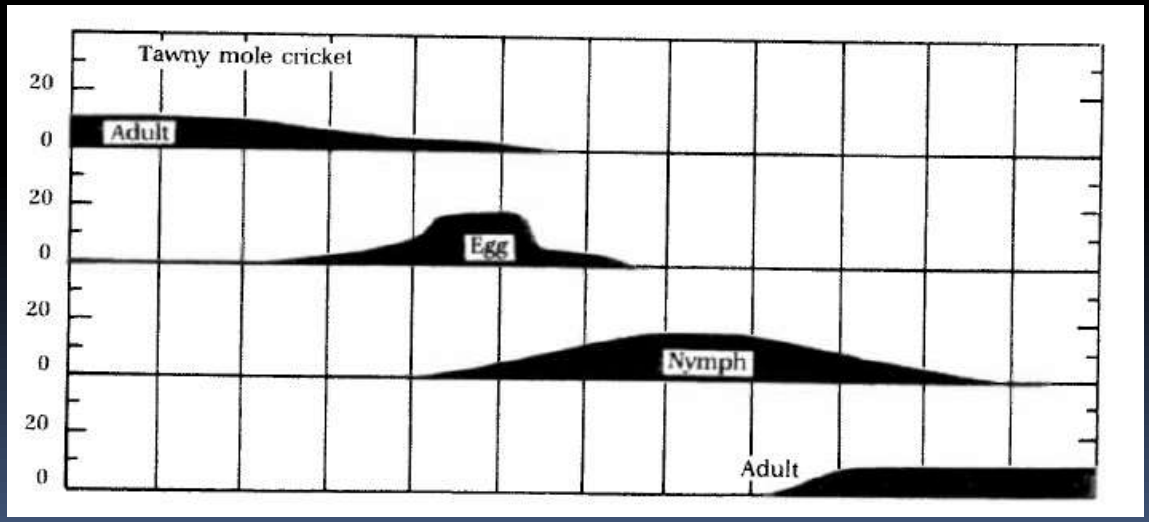
Brandenburg and Villani 1985

Mole cricket – biology

- Overwinter deep in the soil as adults and large nymphs
- In the spring, adults emerge for mating
- Chamber constructed by male used to produce a call which attracts females
- Adult flight: on warm, humid nights, for searching mates or eggs laying site
- Flight activity: Tawny mole cricket is March-early April

  Southern mole cricket in April-June


Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Southern mole cricket
20
0
Adult
20
0
Egg
20
0
Nymph
20
0
Adult


Tawny mole cricket
20
0
Adult
20
0
Egg
20
0
Nymph
20
0
Adult

Vittum 1999

Mole cricket – biology

- Eggs laid in soil: 35 to 40 eggs per clutches
- Eggs hatch: 3 to 4 weeks in May or early June,
- Nymphs tunnel after hatching
- Nymphs molt 8 to 10 times (3 or 4 months)
- Adults overwinter

Mole cricket – damage

Nematode

Steinernema scapterisci

Larra bicolor

http://entnemdept.ufl.edu/creatures/beneficial/larra_wasps.htm

Flowering plants

Spermacoce verticillata

http://entnemdept.ufl.edu/creatures/beneficial/larra_wasps.htm

Photo credits

- Universty of Florida
- University of Kentucky
- University of Ohio
- Crop Science Society
- Columbus State University
- Bugwood