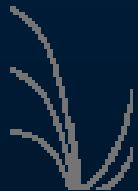


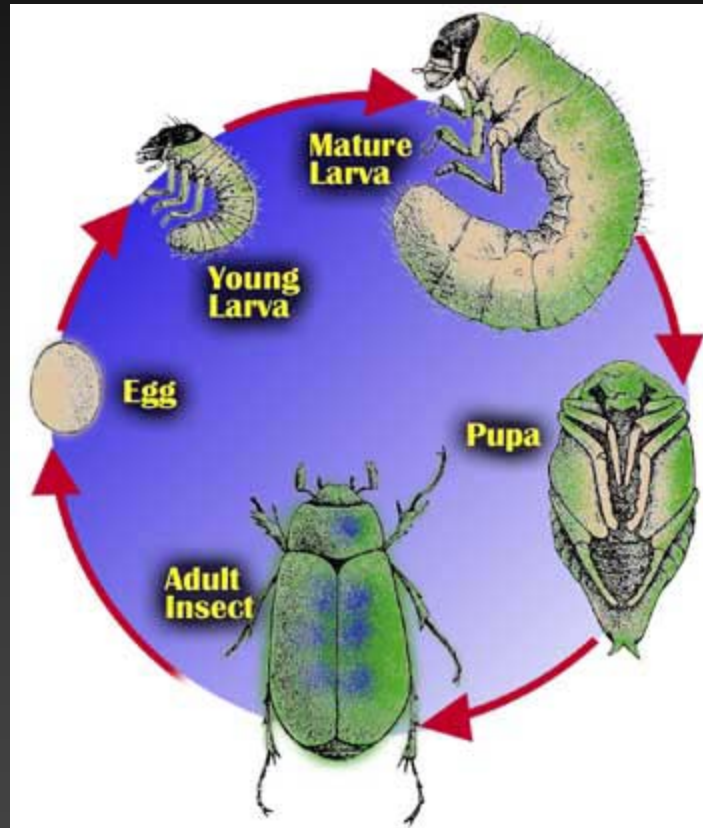
INSECT PESTS OF ORNAMENTAL PLANTS



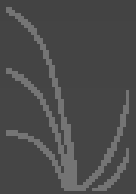
Debra Martin
State Survey Coordinator
Virginia Dept. of Agriculture



Complete metamorphosis

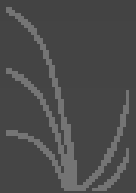


Basic knowledge of insect life cycle is important for control..... additionally, Learn your plant material & their most common pests....Scout the landscape



Common Insect Pests in Virginia

- ☑ Aphids
- ☑ Hemlock Woolly Adelgid
- ☑ Spider Mites
- ☑ Lacebugs
- ☑ Scale Insects
- ☑ Japanese Beetle
- ☑ Boxwood leafminer
- ☑ Bagworms
- ☑ Eastern Tent Caterpillar
- ☑ Borers
- ☑ Fire Ants
- ☑ Exotic introductions



Types of Insect Damage

- Plant **sucking** insects
 - Aphids, spider mites, lacebugs, scales
 - Stippling of leaves
- Leaf **chewing** insects
 - Caterpillars, Beetles
 - Webworms, Eastern tent Caterpillar, Japanese Beetle
- Wood **boring** insects
 - Beetles, moths
 - EAB, ALB

Aphids



Aphid Management

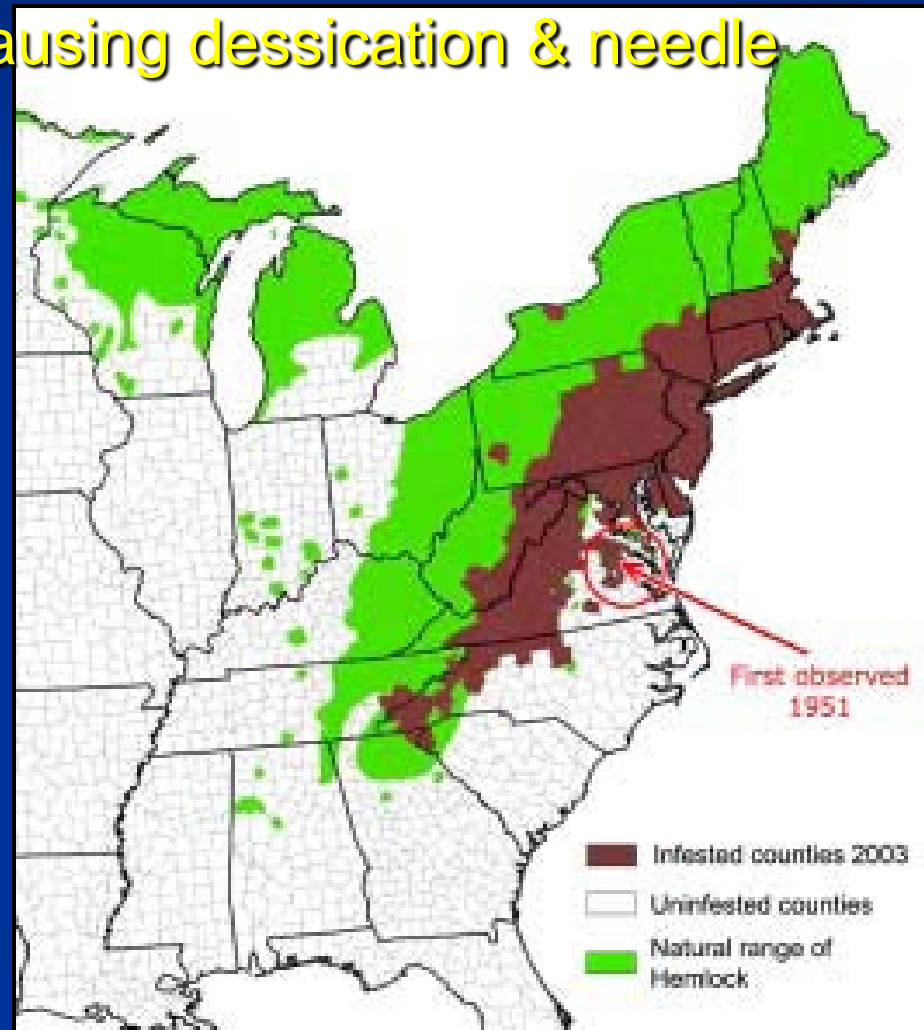
- Do not spray when plants are flowering and honeybees are active.
- Be aware of lady beetles, aphid lions, syrphid larvae, and other populations
- Use less toxic and less hazardous materials in public areas, around homes, and where plants are to be moved or transplanted
-

Hemlock Woolly Adelgid



HWA

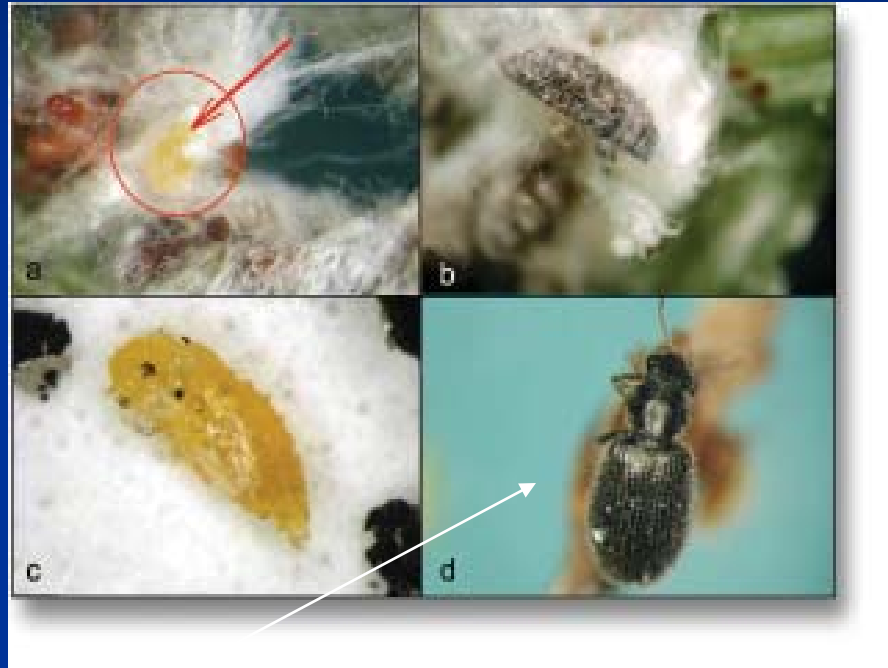
- Feed at base of needles, causing desiccation & needle loss
- Native to China and Japan
- Hemlocks have little or no resistance
- Wind, birds, deer, humans help spread HWA
- Tree mortality w/ 4 years of infestation



Hemlock Woolly Adelgid

- Biocontrol agents - insect and fungal.
- Horticultural oils work very well but need good coverage and while plant is dormant.
- Imidacloprids (Merit) are effective as basal trunk spray

Biological Control of HWA

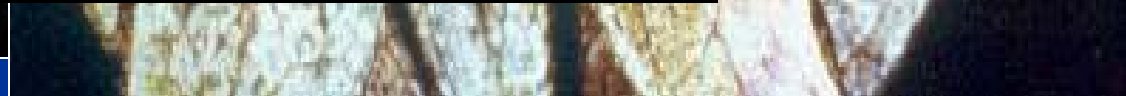
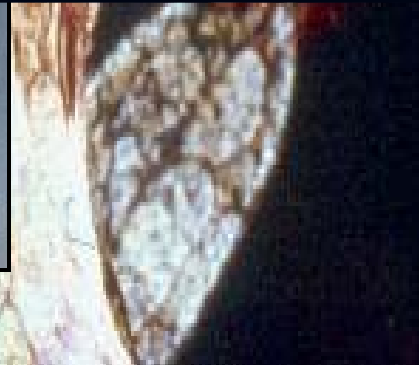
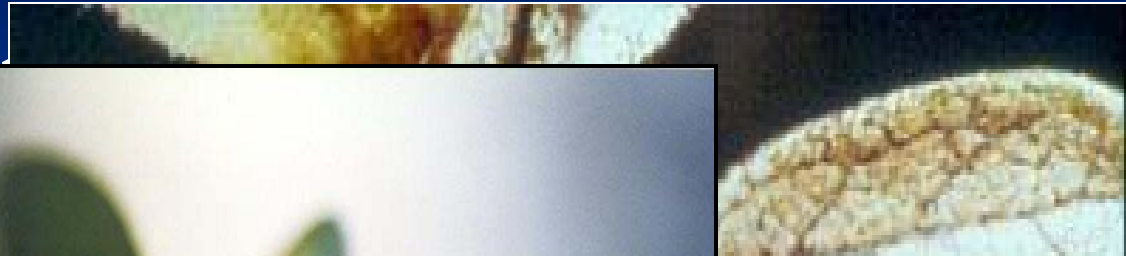


- Research has been done on lady beetle predators in China and Japan - *Sasajiscymnus tsugae*
- *Laricobius nigrinus* (Coleoptera) program at Virginia Tech – native to the Pacific northwest
- Rearing done in VA Tech lab

Spider Mites



Lacebugs

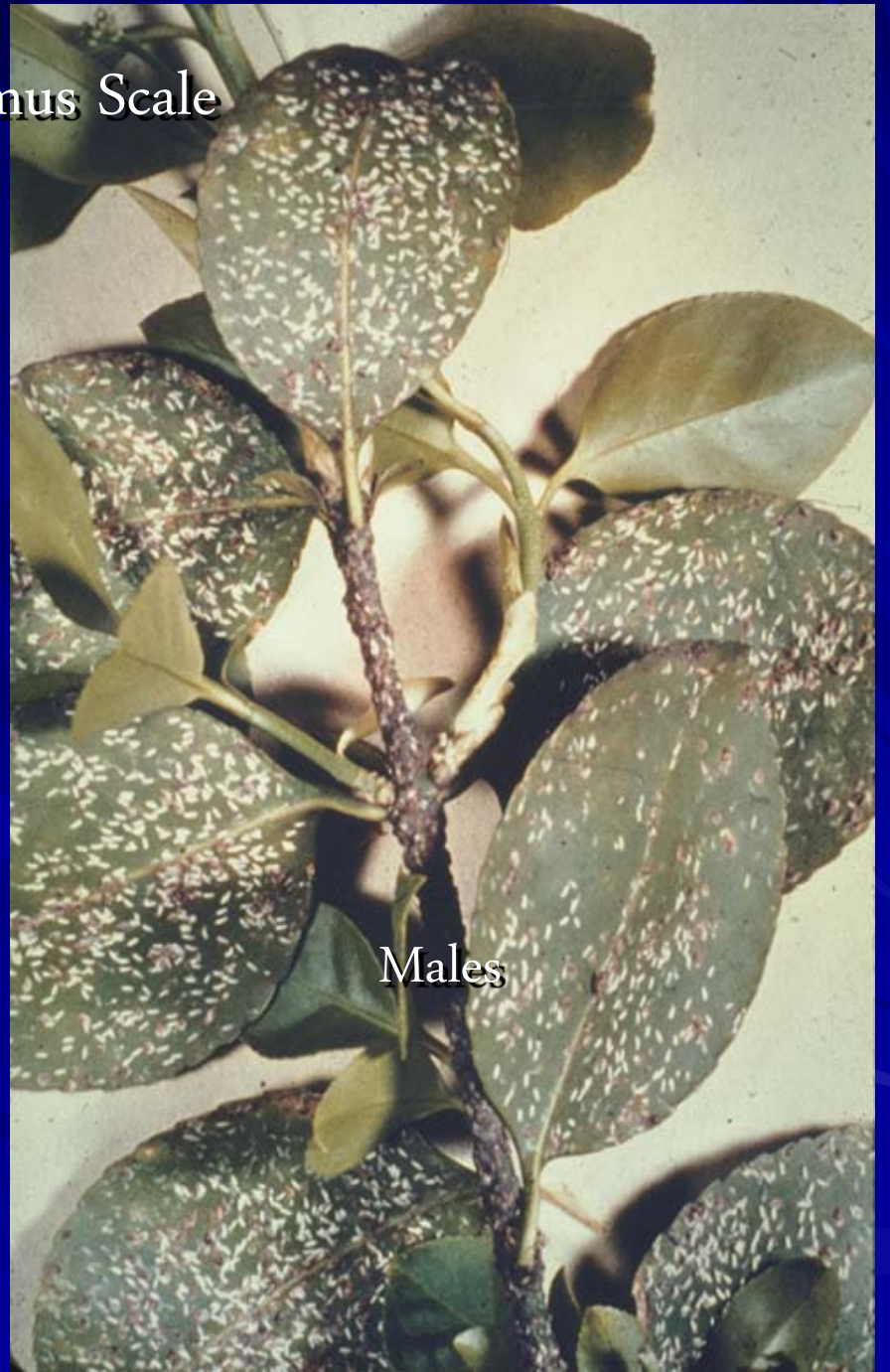


Scale Insects

- Large or tiny, white or brown “bumps” are found on leaves, twigs, bark or fruit
- Scale insects are also “sap suckers” and cause loss of vigor and even death
- Over 3000 species in North America
- Hard-shelled and soft scales
- Common scales in this area:
 - Euonymus scale, camellia scale, obscure scale
 - White peach scale, wax scale

Euonymus Scale

Females



Males

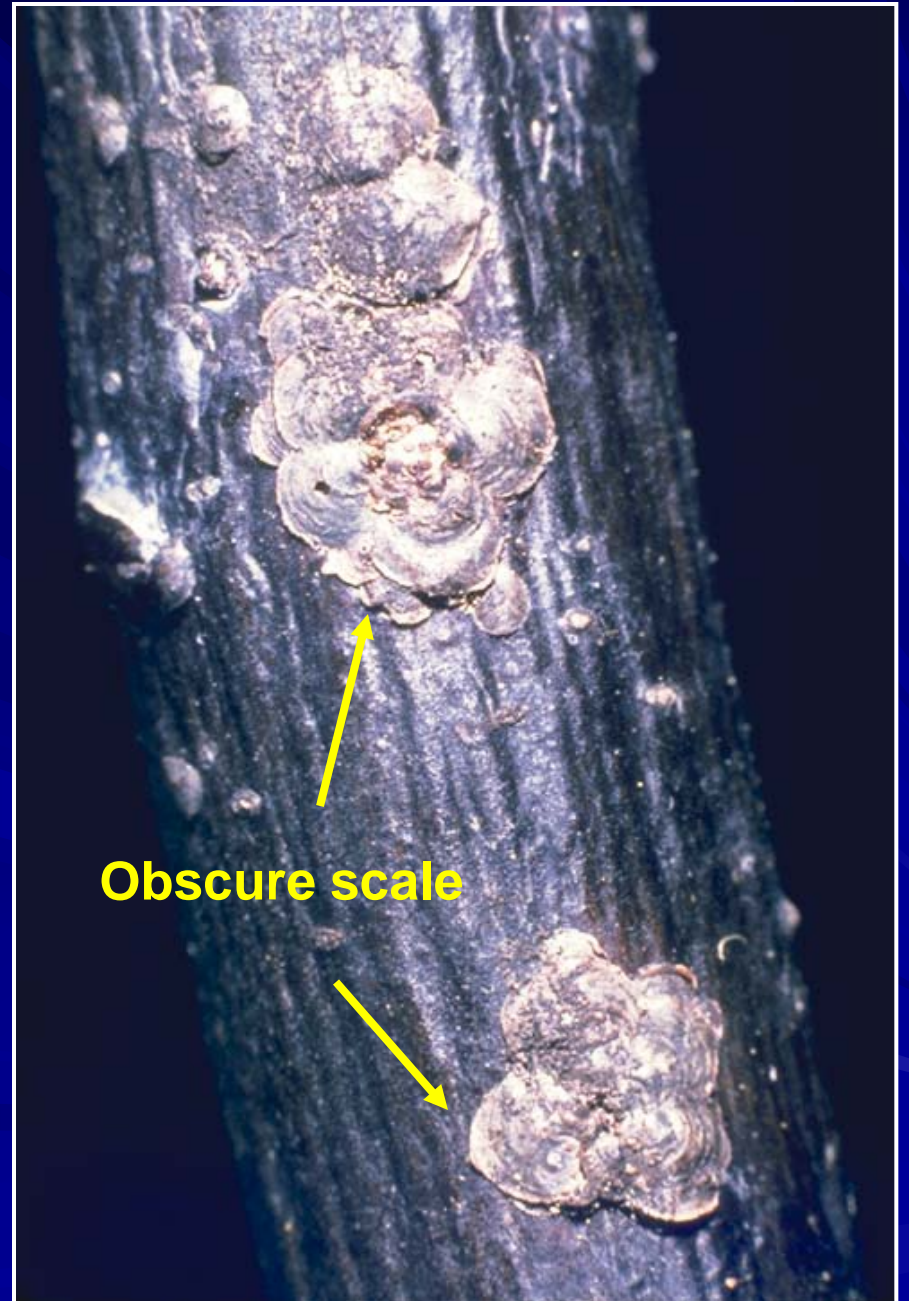




white peach scale



tea scale



Cottony Camellia Scale



Cottony maple leaf scale ovisacs on dogwood in late April (too early to spray).

Wax Scale



Control of scale insects

- * Females lay eggs or give birth to living young called crawlers
- * Crawler stage is vulnerable to insecticides
- * Generally crawl in May & June, then again in August & September, if more than one generation
- * Many natural predators
- * Horticultural oil in general, malathion for crawlers

06 NURSERY CROPS: *Insects*

Pest	Control	Timing of Treatment	Remarks
SCALE INSECTS (All scales)	thiomethoxam dinotefuran horticultural oil imidacloprid lambda-cyhalothrin thiomethoxam	Treat with horticultural oil in late March or early April before new growth develops, and when temperatures are not likely to go below 40°F (5°C) for 12- to 24-hours. Oils can also be used as summer sprays when indicated on the label.	Do not spray oil-sensitive plants listed under precautions on the label. Be sure to follow the dosage rates given on the label for the various scale species. Thiomethoxam is labeled for softscales.
Azalea bark scale	carbaryl diazinon insecticidal soap lambda-cyhalothrin malathion	Crawlers: June 5-25. Treat June 10-30.	
brown soft scale	bifenthrin buprofezin carbaryl diazinon fenoxycarb insecticidal soap lambda-cyhalothrin	Treat when scale insects appear. Treat 2-3 times at 10-day intervals.	This scale insect does not winter out-of-doors in colder plant zones of Virginia.

Defoliators

Bagworm





Newly Hatched
Bagworm

Bagworm

- Females are wingless and never leave the bag
- Winter is spent as eggs inside bag
- Hatch in May and June, larvae disperse on silken threads that are “ballooned” by wind
- In August, larva is fully matured and in late August, Sept. after pupation, males leave bags and mate, females lay eggs and die

BAGWORM

acephate
azadirachtin
bendiocarb
bifenthrin
carbaryl
chlorpyrifos
cyfluthrin
diazinon
dimethoate
fluvalinate
lambda-cyhalothrin
permethrin
spinosad
tebufenozide

Apply treatments when bags are less than 1/2 inch. Late May in coastal Virginia, early to mid-June elsewhere. Controls less effective in mid-late summer. DD-600

Lightly misting the foliage is sufficient. Mist blower treatments are effective. Do not use the more toxic or hazardous materials in public areas or around homes. Carbaryl and permethrin may lead to mite increases. Light infestations can be handpicked and destroyed. Dimethoate and bendiocarb are being phased out.

<http://pubs.ext.vt.edu/456/456-017/456-017-04-NurseryCrops.pdf>

Treat larvae in mid to late June
- Bt

Bagworm larvae



Photo by Michael Masiuk

Eastern Tent Caterpillar





UGA0590063a





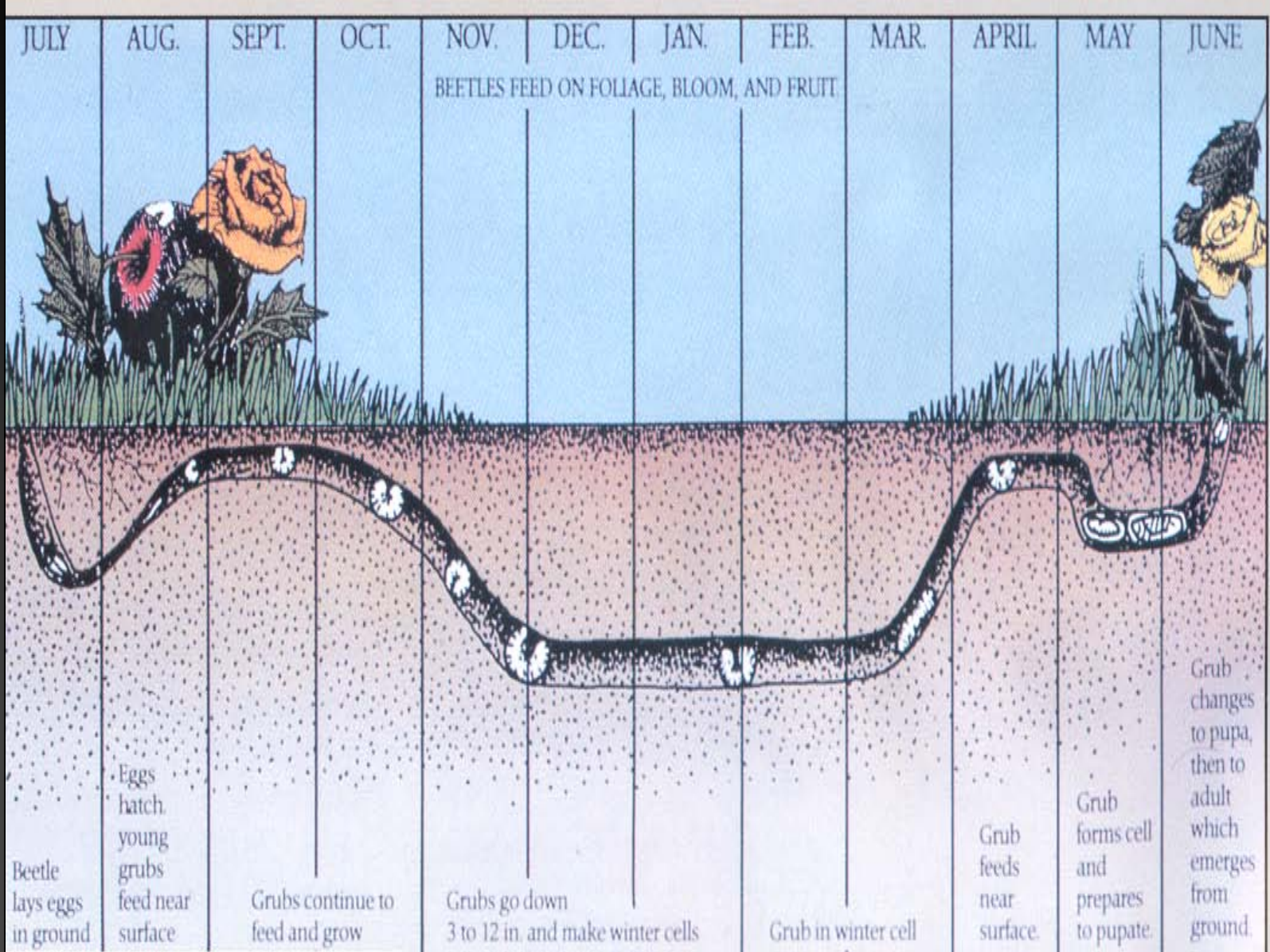
Fall Webworm on Pecan

UGA2721034

Japanese Beetle

an invasive pest since 1916





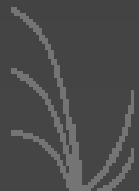


Biological Control

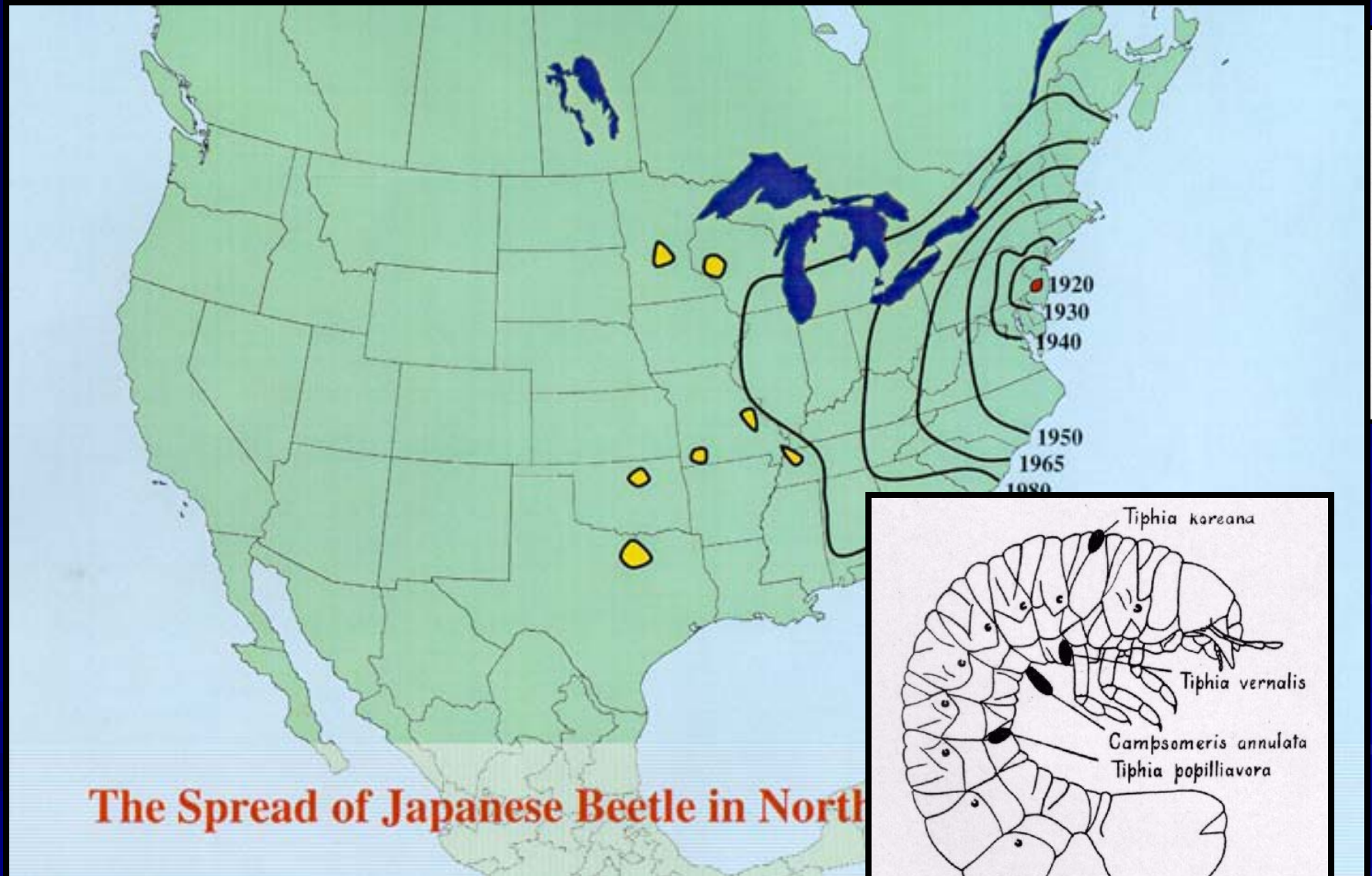


- **Parasitic Nematodes:** Irrigate turf before *and* after.
- ***Bacillus thuringiensis* (Bt):** small grubs (mid-summer treatments) *Bacillus thuringiensis* (Bt) is a naturally occurring bacterial disease of insects. Bt insecticides do not have a broad spectrum of activity, so they do not kill beneficial insects .
- **Milky Spore:** need dense larval population and several years to build up spores.
- **Parasites:** for both grubs and adults are being established.

http://www.oardc.ohio-state.edu/biocontrol/j_beetle.htm



Biocontrol Using the Spring



The Spread of Japanese Beetle in North

Chemical Control



- Late June or early July after adults have begun to congregate applications of imidacloprid (Merit) in June and July have sufficient residual activity to kill the new grub populations as they come to the soil surface in late July through August
- Milky spore (*Bacillus popilliae*)
- Careful use of Sevin

Boxwood Leafminer

- Primarily a problem in American Boxwood
- Marathon or Merit recommended chemicals
- Cygon also possibility for summer use
- Pruning

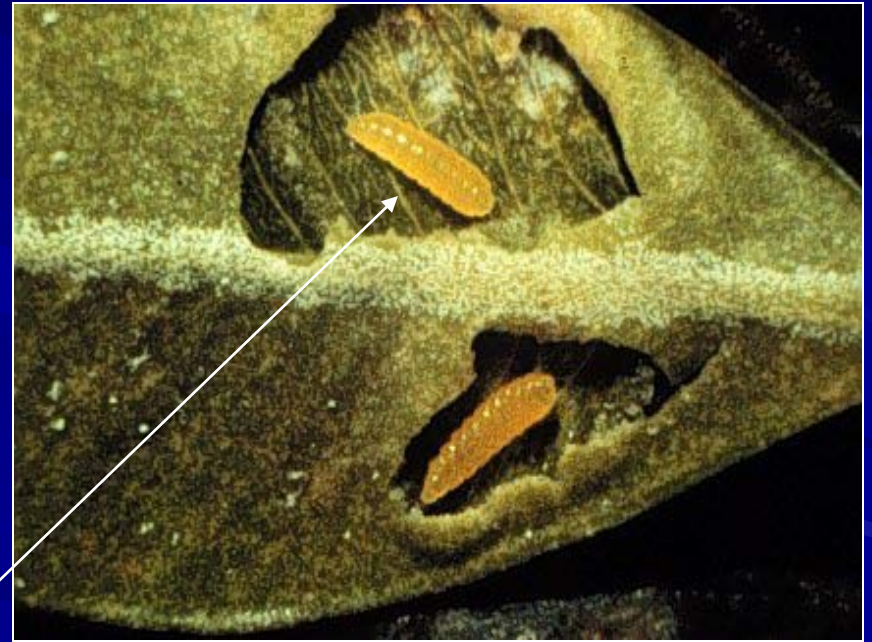


Boxwood Leafminer
Adults (fly)





Boxwood Leaf Miner larval damage



Larvae

BORERS



Asian Longhorned Beetle (ALB)



ALB Exit hole



Peach Borer



Dogwood twig borer

Borers

- Larvae of beetles or clear-winged moths.
- Adults lay their eggs on bark.
- The larvae bore into the trunk or limb.
- Feeding cuts off the flow of water and nutrients to upper parts of the plant.
- Kills everything above the entry point.
- Chemical control – bifenthrin, permethrin

Prevention:

The best way to control borers

- Attracted to stressed or injured plants.
- Wounds or previous damage invite borers.
- Avoid pruning during the growing season.
(except to remove infested branches)

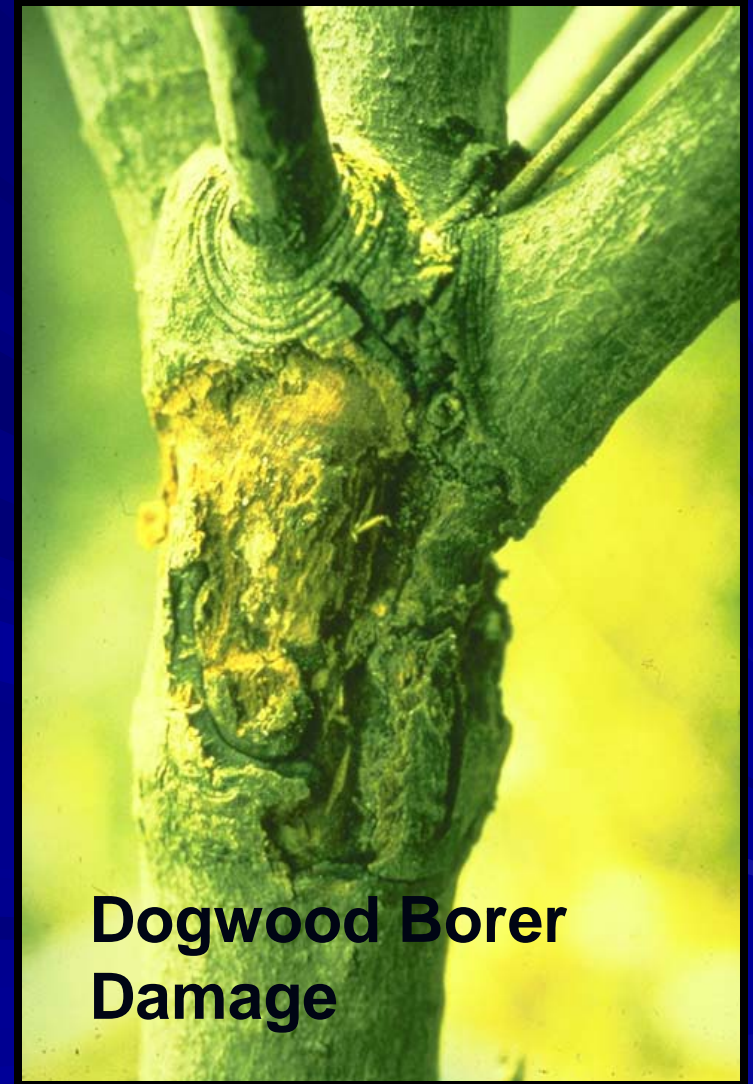
Dogwood Borer

- Clearwing Moth (wasp mimic)
- Dogwood, pecan, elm, hickory, and willow
- Moths active May to September
- Search for open wounds - resinous smell -



Chemical Control

- Treat trunk & larger branches early May. Repeat at 6 week intervals, 2-3X.
- Bifenthrin, Chlorpyrifos, Endosulfan, Permethrin
- Restricted Use “Danger” Signal Word
- Better to prevent



**Dogwood Borer
Damage**

Asian Ambrosia Beetle

- Entered the U.S. at Charleston, South Carolina in 1974
- Attacks various trees and shrubs
- Adults and larvae bore into twigs, branches or small trunks of woody host plants, excavating a system of tunnels and introducing a symbiotic ambrosial fungus on which they feed. Boring and introduced fungus clog the xylem, ultimately killing all or part of the plant.

Strings of boring dust produced by female beetle

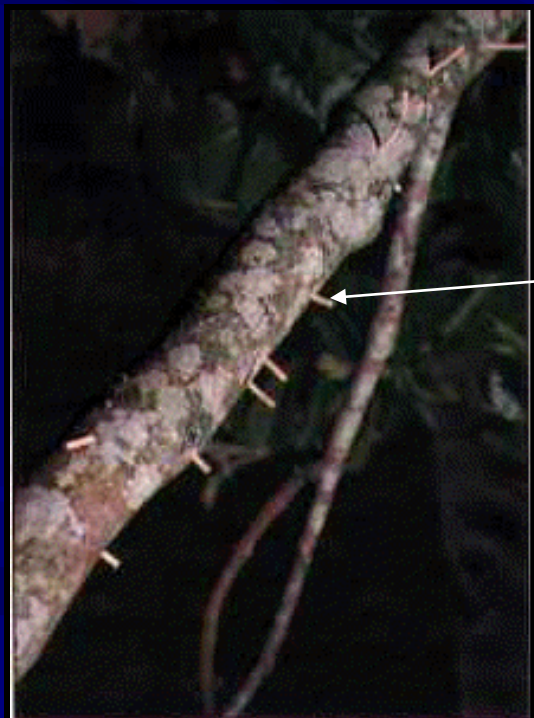


Figure 1. Infested branch showing "toothpick" spines at beetle entry sites.



Control of AAB

- Adults active mid-March to April
- Takes about 55 days to complete life cycle
- May have 2 or more generations per year
- Attacked trees attractive to other beetles
- Leave infested trees for 2-3 weeks
- Beetles are feeding on fungus, not tree – systemics ineffective



“toothpick” stage in early May
2005 – later than usual

CAPS

- The Cooperative Agricultural Pest Survey Program is a combined effort by state and federal agricultural agencies to conduct surveillance, detection, and monitoring of exotic plant pests of agricultural and natural plant resources and biological control agents. Survey targets include plant diseases, insects, weeds, nematodes, and other invertebrate organisms.

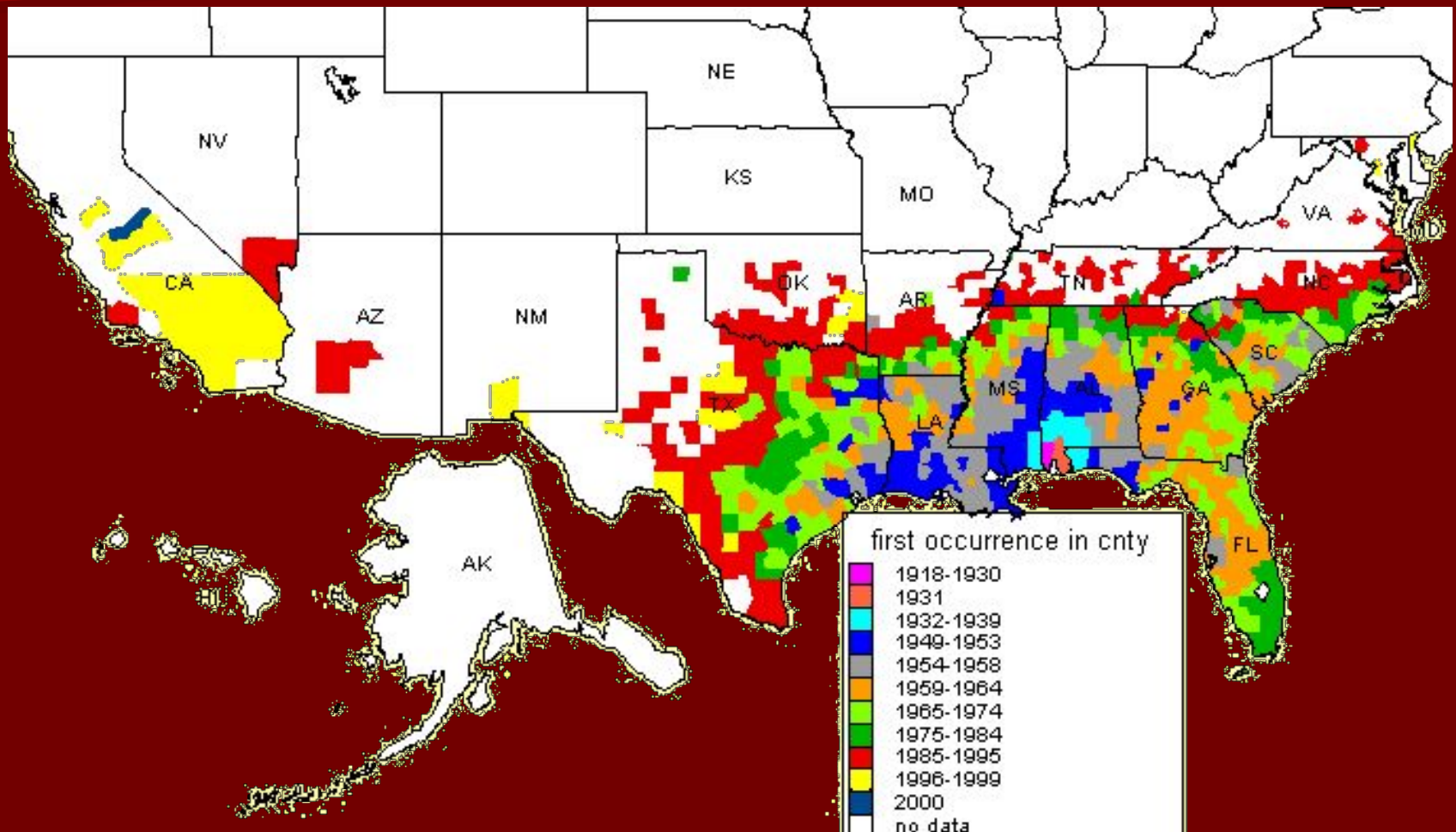
FIRE ANTS

RIFA workers x 3



RIFA worker

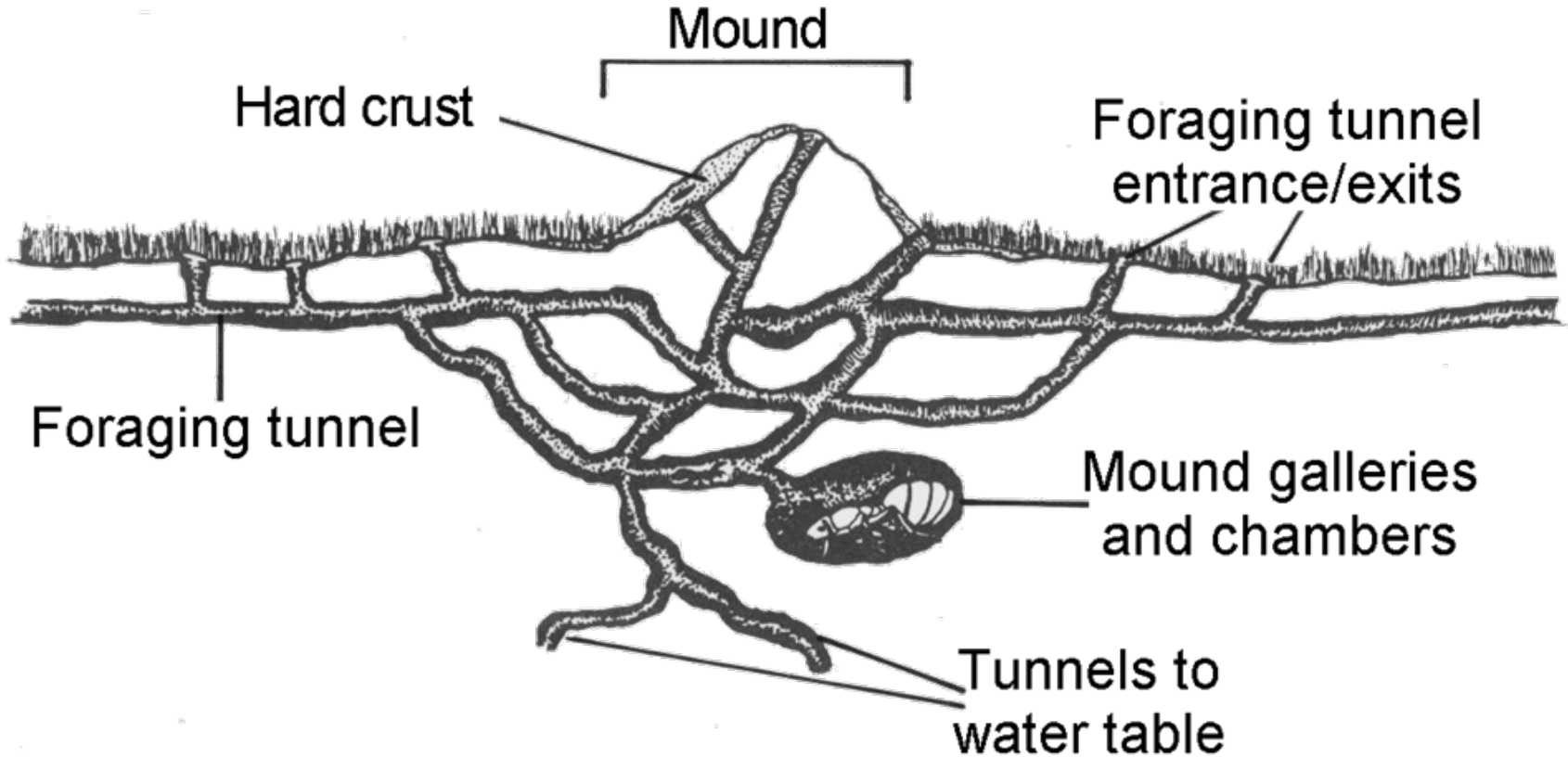
Distribution of fire ants in the US



Identification

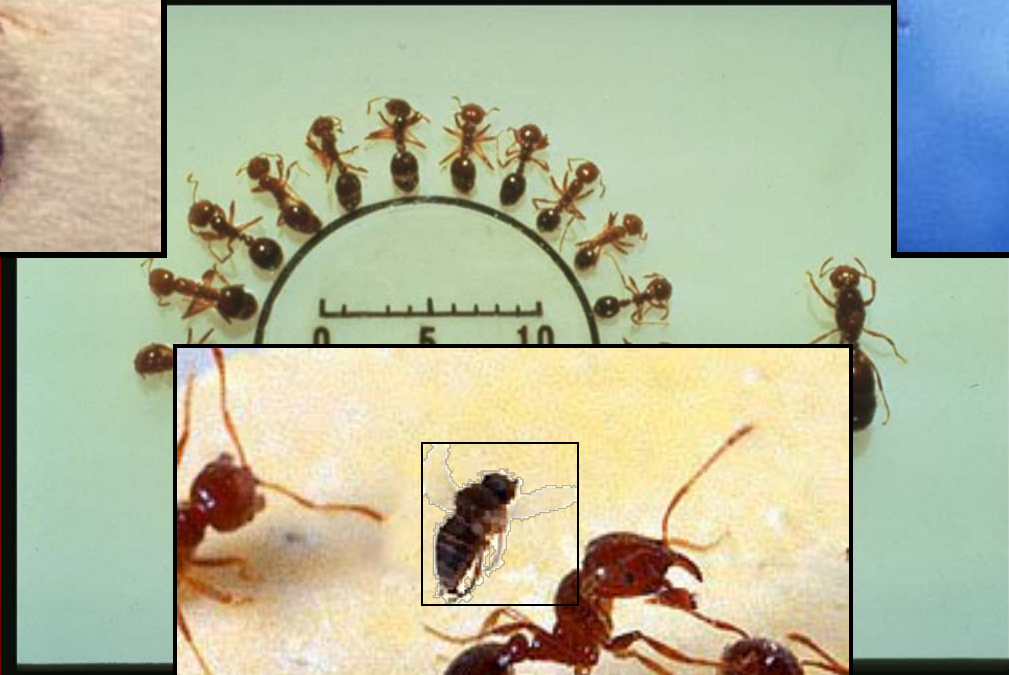
- 💣 Small reddish-brown ants
- 💣 Sizes range from 1/16 to ¼ inch
- 💣 Build characteristic mounds
- 💣 Extremely aggressive behavior

Identification



FIRE ANTS

Bio-Control Phorid flies



Typical Mounds in VA



CAPS Bio-Control

- Phorid Fly



If you spot fire ants . . .

- Use caution
- Do not disturb mound
- Contact VDACS at 786-3515 or
- Notify your Extension Agent
- Quarantine implemented summer of 2009 –
 - Counties of James City and York & cities of Chesapeake, Newport News, Norfolk, Hampton, Poquoson, Portsmouth, Suffolk, VA Beach & Williamsburg