







Structural and Household Pests

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Learning Objectives

- Common nuisance pests & serious structural pests
- Distinguish a termite alate from an ant
- Methods of controlling fleas and ticks on pets

- Preventing and controlling ants & roaches
- Stored product & pantry pests and their control
- Occasional household invaders and stinging pests in the home and landscape

Ultrasonic Devices Do Not Repel Pests!

Huang, F., B. Subramanyam, and J. Clark. 2002. Laboratory and field trials with commercial ultrasonic devices against three ant species (Hymenoptera: Formicidae). *J. Agric. Urban Entomol.* 19: 25-28.

- “The three commercial devices used in our study failed to repel *C. festinatus*, *C. pennsylvanicus*, and *F. pallidefulva* in laboratory and field trials. Similar negative findings with ultrasound have been reported against corn earworm adults (Shorey et al. 1972), cockroaches (Koehler et al. 1986), mosquitoes (Sylla et al. 2000), and fleas and ticks (Hinkle et al. 1990, Brown & Lewis 1991, Dryden et al. 2000).”



Hiring a Professional Pest Control Company

- *Customer Service*
- Friends, neighbors, co-workers (reputation)
- No “yellow page” selections; be careful of exceedingly low prices
- Questions to Ask:
 - Does the company perform in-house training?
 - Is the company a member of their State and/or National Pest Control Association?

Product Types

- Key Steps in Pest Control
 - Pest Identification
 - Inspection
 - Control Options: Chemical, Non-Chemical, Both
- Product Formulations
 - Baits-for cockroaches and ants; use indoor and outdoor
 - Granulars-for crawling insects; use outdoor only
 - Dusts-for crawling insects; use in voids only
 - Aerosols-do not use
 - Liquid Sprays-for crawling insects; use outdoor only as *perimeter* or *spot*

Baits

Baits are combinations of small amounts of pesticide with a food palatable to the target insect. Baits can be packaged as granules, pellets, gels, pastes, liquids, or ready to use stations.

Granulars

Granulars are formed by coating or impregnating coarse particles of a substance (e.g., clay pellets, limestone chips, corn cob) with pesticide to obtain a certain percentage concentration.

Dusts

Dusts are made by combining a small amount of insecticide or insecticide concentrate with an inert diluent, such as powdered clay or talc.

Emulsifiable Concentrates

Technical grade material is dissolved in petroleum-based solvents, and an emulsifier is added to facilitate mixing of solvent and water, forming a milky-white emulsion.

Moisture Management

- Persistent moisture attracts pests and allows them to thrive.
- Manage Moisture:
 - ground covers
 - mulch
 - surface water drainage
 - gutters and downspouts

Factors that Limit the Growth of Pest Populations

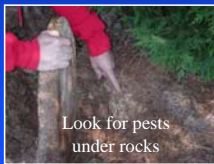
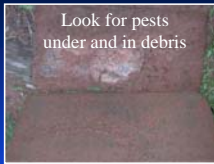
- *Water*
- Food
- Warmth



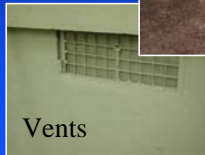
Excessive Moisture and Harborage Leading to Perimeter Pests



Inspect Under and in Debris for Pests Moisture and Harborage



Waterproofing is Important

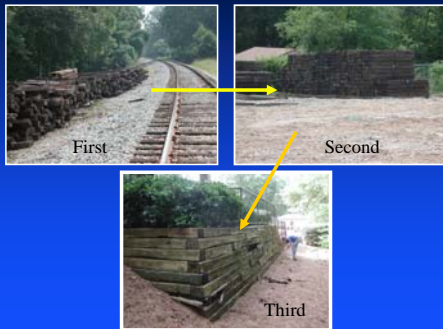


Wood Destroying Insects

Subterranean Termites

- **Native Species**
 - Eastern ST, *Reticulitermes flavipes* (most common)
 - Light southeastern ST, *Reticulitermes hageni*
 - Southeastern ST, *Reticulitermes virginicus*
- **Introduced Species**
 - Formosan ST, *Coptotermes formosanus* (most destructive)
- **Occurrence:** Termites are Everywhere! But, this does not necessarily mean infestations are inevitable.
- **Susceptibility of home to attack**
 - Construction type
 - Conditions in and around structure (moisture)

Formosan Termite Spread Railroad Cross-tie Retaining Walls



Formosan Termites in Georgia

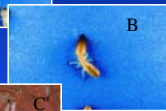
Why the Fuss?

- Formosan termites are more destructive than Georgia's native subterranean termites.
- Formosan termites are not native to the United States. Human commerce has resulted in their worldwide distribution. Perhaps the first introduction into the U.S. was in New Orleans, LA shortly after WW II.
- Within the U.S., they continue to be introduced into un-infested areas, from infested areas, via decorative railroad cross-ties.
- Growing communities are of particular concern.



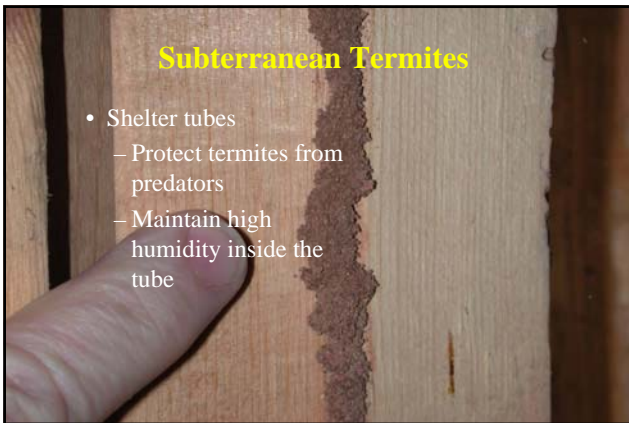
Subterranean Termites

- The *Caste System* of Colony Organization
 - Worker caste (A)
 - Soldier caste (B)
 - Reproductive caste (C)



Subterranean Termites

- Shelter tubes
 - Protect termites from predators
 - Maintain high humidity inside the tube



Subterranean Termites

- First Sign of Infestation: *The Swarm*
 - Thousands of winged termites (reproductives) appear suddenly
 - *Swarms* are common outdoors in spring
- Ant versus Termite Swarmer
 - Antennae: Ants are elbowed, termites are straight and beaded
 - Waist: Ants have one, termites do not
 - Wings: Ants have two pairs where first pair is larger than second pair, termites have two pairs but all four wings are the same size

Subterranean Termites

- Homeowners and Termite Control
 - Don't do it!
- Termite Control Service Contracts
 - Retreat only
 - Retreat and Repair
- The Annual Inspection
- Some Factors That May Affect Contracts
 - Type of Construction
 - Wood to Ground Contact
- *Termite Control Services: Information for the Georgia Property Owner* (UGA Extension Service Bulletin 1241)

Homeowners and Termite Control

Termite Control Contracts

- Renewable annually, after receipt of a fee.
- Retreat Only Contract. Provides for retreatment of a recurring infestation ONLY.
 - ✓ if problem persists, request different treatment techniques (e.g., foaming in voids).
- Retreat and Repair Contract. Provides for retreatment of a recurring infestation and the repair of damage caused by termites.
 - ✓ Be aware of contract's terms, especially exclusions (e.g., alterations to structure, wood-to-ground contact, disruption of barrier, old versus new damage, who will conduct repairs if needed).
 - ✓ Most contracts exclude Formosan termites.
- Select contracts that provide for an annual inspection.

Homeowners and Termite Control

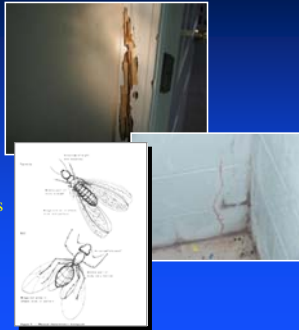
*Termites and Public Attitudes:
A University of Kentucky Survey*
(<http://www.pctonline.com/articles/article.asp?ID=975&AdKeyword=Potter>)

- Only 19% knew that shelter tubes and mud found inside galleries were telltale signs of termite infestation; less than 10% could differentiate between winged ants and winged termites.
- 92% believe that termites eat wood quickly, and can cause extensive damage to a house in a short period if not stopped.
- 60% believe that treatment of a home for termites costs \$500 or less; only 13% thought it would cost \$1,000 or more.
- 65% believe that if termites return following treatment that the company was obligated to return and retreat the structure and repair any damage caused by the termites.

Homeowners and Termite Control

Diagnosing a Termite Infestation

- Termite-damaged wood
 - ✓ age of damage?
 - ✓ chew wood with grain
 - ✓ mud in galleries
- Winged termites
 - ✓ the consequences of mis-ID
 - ✓ not harmful, and most die
 - ✓ inside versus outside swarms
- Shelter tubes
 - ✓ active (moist)
 - ✓ inactive (dry, brittle), but...



Wood-to-Ground Leads to Termite Infestation



Carpenter Bees




- Life cycle
 - April-adults chew wood to lay eggs
 - Mid-Summer-new adults emerge
 - Fall-adults return to birthplace to overwinter
 - Spring (next year)-overwintered adults emerge, mate, and process renews.
- Control

Wood Destroying Beetles

- Powderpost Beetle (Lyctidae)
- Deathwatch Beetle (Anobiidae)
- Old House Borer (Cerambycidae)

Lyctid Powderpost Beetles



- Infest young hardwoods only (floors)
- Most common emergence is winter
- Eggs laid on unfinished wood.
- Typical life cycle is one year or more.
- Control is expensive

1/32 to 1/16 inch
in hardwood only

Generalized PPB Life Cycle

- Eggs laid in wood pores & cracks, mainly at night.
- Larvae tunnel through wood (powder like frass)
- Pupate just below wood surface
- Adult beetles emerge (shot holes)
- Mating and reinfestation of unfinished wood
- Life cycle 1-3 years; can take longer

Lycid PPB Feeding Preferences

- Newly cut (1-3 year old), kiln-dried hardwoods with 10-20% moisture (oak, hickory, ash, walnut, pecan, poplar, sweetgum, and black cherry)
- Wood is often infested in the lumber yard before it ever makes it into the home.
- Picture frames, paneling, furniture, flooring, tool handles, gun stocks.
- Frass is fine, flourlike and loosely packed into tunnels.
- Shot holes are round and 1/32 to 1/16 inch diameter.
- Rafters, joists, studs and other structural timbers are not attacked as they are typically softwoods.

Anobiid (Deathwatch) Beetles

- Infests softwoods (mostly) and hardwoods
- Common in structural softwoods of older homes (high moisture content)
- Will re-infest
- Control:
 - Wood treatment, fumigation or wood replacement
 - dry the crawlspace (vents, vapor barrier)



Anobiid (or Deathwatch) Beetle Feeding Preferences

- Hardwoods AND softwoods.
- Prefers moisture-laden wood (e.g., crawl spaces with softwood beams and moisture problems). Infestations are rare in well-ventilated homes with few moisture problems.
- Prefers both freshly seasoned and older wood
- Maple, beech, poplar, and pine are especially susceptible.
- Hardwood picture frames, paneling, furniture, flooring, tool handles, gun stocks, as well as rafters, joists, studs and other softwood structural timbers.

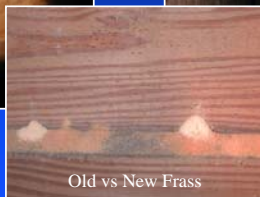
Distinguishing Wood Boring Beetles

Beetle	Ballpoint pen test	Frass test
powderpost beetles (Lyctids)	only tip of pen fits in exit hole	feels like talc
deathwatch beetles (Anobiids)	the tip and part of the angled face fits in exit hole	feels gritty

Wood Boring Beetles in Homes UC ANR Publication 7418

Anobiid Powderpost Beetles in Crawspaces: Is the Infestation Active?

Frass and Shot Holes



Diagnosing Anobiid Infestations: Is the Infestation Active?

- Stethoscope
- Acoustic Emissions Detector
- Sweep up frass and reinspect
 - fresh frass is light colored
- “New” holes are light in color; “old” holes take on color/appearance of surrounding wood.
- Paint over or draw a circle around shot holes and reinspect to see if new ones have appeared.

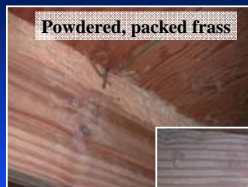


Wood-Destroying Insects Old House Borers

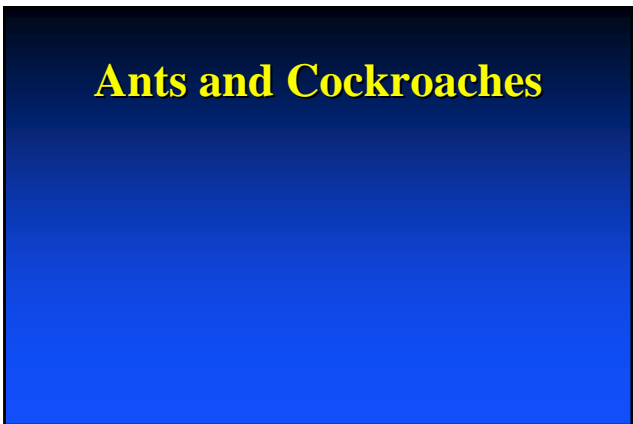
- Infests softwoods only
- Common in structural softwoods of older homes (high moisture content)
- Will re-infest
- Control:
 - Wood treatment, fumigation or wood replacement
 - dry the crawlspace (vents, vapor barrier)



Old House Borer Damage and Exit Holes



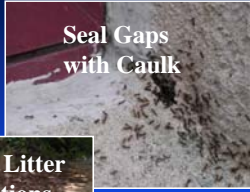






Management of Argentine Ants

Habitat Manipulation









Carpenter Ants


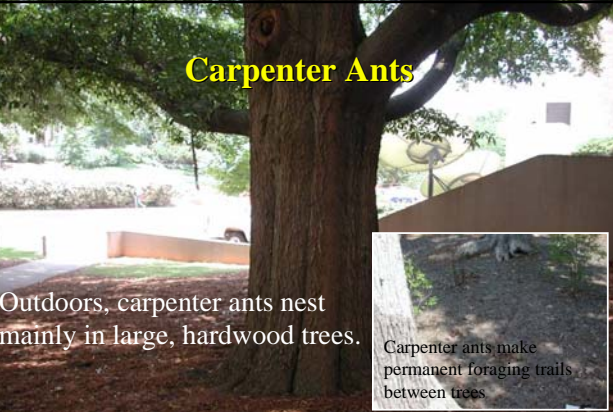
- Chews wood, but does not eat it (sawdust)
- Outdoors, nests in trees; creates permanent trails
- Active at night
- Control
 - Find colony while looking at night; provide gel and/or liquid bait



"Sawdust" from nest cleaning

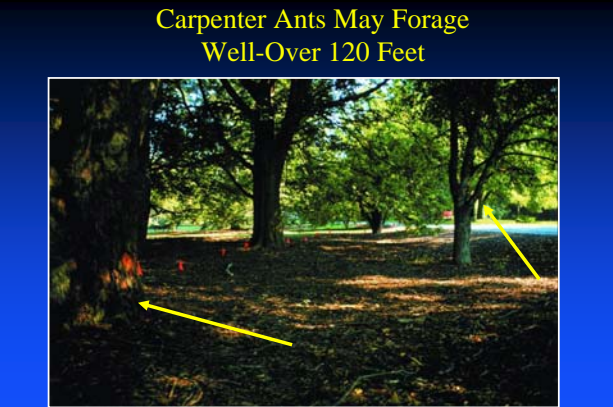
Carpenter Ants

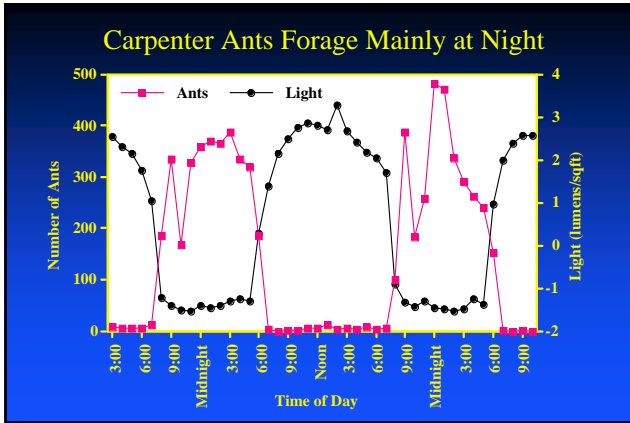
Outdoors, carpenter ants nest mainly in large, hardwood trees.



Carpenter ants make permanent foraging trails between trees.

Carpenter Ants May Forage Well-Over 120 Feet





Red-Imported Fire Ants

- Accidentally introduced into U.S. in 1930s in Mobile, Alabama
- Southeast, California, Australia
- Painful sting
- Pest of yard; rarely invades home
- Control: Texas Two Step
 - Bait in afternoon
 - 10 days later, treat individual mounds

The “Two-Step” Method of Fire Ant Control

Step One: Bait Treatment

Broadcast granular bait in late afternoon, when it is dry and cool, and ants are actively foraging.

The "Two-Step" Method of Fire Ant Control Step Two: Mound Treatment



Non-Chemical Ant Control

- Manage moisture around the home
- Hot water will kill fire ants (also grass)
- Grits, mixing ants, etc. does nothing to fire ant colonies
- Sanitation in General
 - Rinse containers containing sweets
 - Remove garbage regularly
 - Keep branches from touching the house
 - Choose plants that are not fed upon by aphids

German Cockroach

- Obligate indoor pest; kitchens, bathrooms, bedrooms
- Spread by "hitchhiking"
- Control
 - Sanitation
 - Gel baits (spray if only if population is large)
 - Bait stations
 - Sticky traps and jar traps

Smokybrown Cockroach

- Primary large, outdoor cockroach pest in Georgia
- Lives in treeholes, attics, crawlspaces, and other protected environments
- Most active at night
- Control
 - Gel baits (primary)
 - Liquid sprays (secondary)
- Baits Conserve Cockroach Natural Enemies



Egg capsule (ootheca)

Smokybrown Cockroach Habitat

Treeholes, Crawlspaces, Attics, Wall Voids, Crossties



Use Baits Instead of Sprays for Cockroach Control in Treeholes

Sprays: Kill cockroach egg case parasites and contaminate parasite attractants, thereby disrupting natural controls.

Gel Baits: Conserve cockroach egg case parasites and prevent contamination of attractants.



Biting & Stinging Pests

Biting and Stinging Pests Paper Wasps

- Predators on insects, especially caterpillars
- Open comb nests
- May build nests in eaves of homes
- May defend their nest aggressively



Other Wasps



Potter wasp



Potter wasp pots



Sphecid wasp

- Solitary
- Predatory
 - Insects
 - Spiders
- Not aggressive

Hornets

- Bald faced Hornet
 - Black and white in color
 - Active in the day
 - Can be aggressive
- European Hornet
 - Brown and tan in color
 - Active at night
 - Usually live near woods
 - Generally not aggressive, even at their nest

Yellow Jackets

- Social
- Predatory
- Ground Nesting
- Aggressive at their nest site

Prey item

Bees

- Beneficial pollinators
- Can be solitary or social

Solitary Bees:
- Non aggressive
- Often nest in bare ground

Digger bee

Social bees:
- May sting if nest is threatened

Honey Bee





Bed Bugs

- Feed on blood
- May travel some distance for a meal
- Flattened to hide in cracks and crevices
- Can be difficult to get rid of



Bed Bug Control

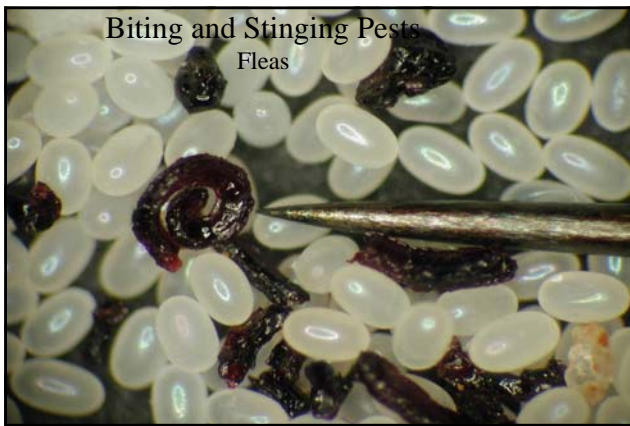
- Find all hiding places
 - Mattress seams
 - Behind the headboard
 - In switch plates and electrical sockets
 - Behind picture frames
 - Behind baseboards
- Treat all hiding places or vacuum those that can't be treated
- May require professional help

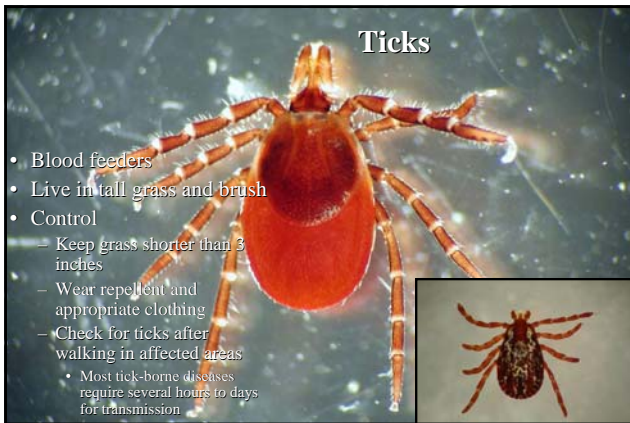


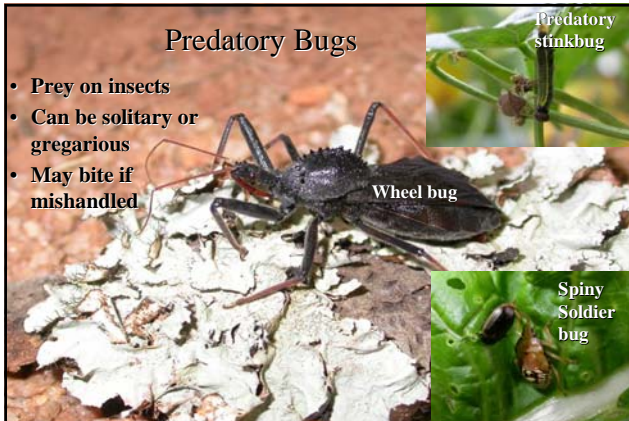
Biting and Stinging Pests Fleas

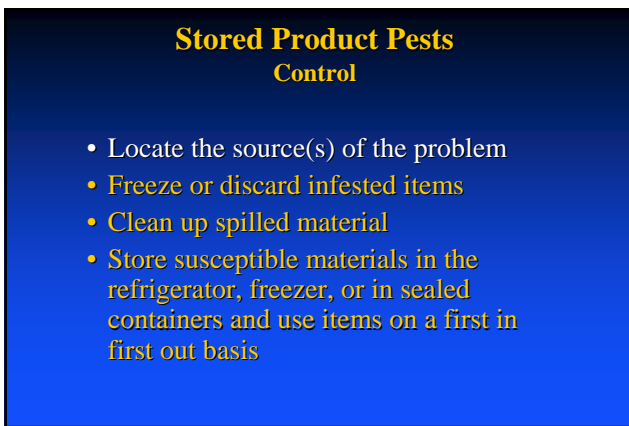
- Obligate blood feeders (pets)
- Adults live entire life on animal
- Attracted to carbon dioxide
- Control
 - On animal
 - Animal bedding/resting areas
 - Vacuum

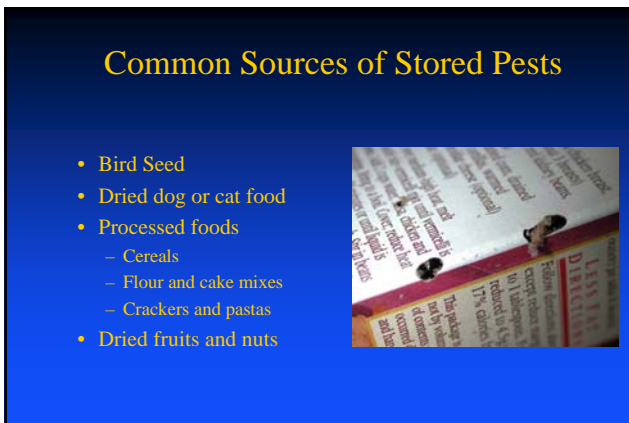












Unusual Sources

- Chocolate
- Tobacco
- Dried Peppers
- Dead insects
- Rat bait



Freeze or Discard

- Freeze in non-frost free freezer if possible
- Freeze for at least a week to be safe
- Discard items outside the home and away from other susceptible items
 - Bird seed
 - Rat baits
 - Dog food or Cat food

Clean up spilled material

- Sweep up crumbs
- Vacuum spilled material from cracks and crevices
- Spilled food can be a reservoir for larvae
 - Stored product pest larvae are small and don't require a lot of food to develop

Storage of Stored Products

- Sealed containers should have tight lids
 - Many stored product pests are small and/or flattened
- Older items should be used first
 - Items allowed to sit unused provide ideal harborage
 - Dark
 - Larvae can multiply unobserved

Stored Product Pests

Beetles



Sawtoothed grain beetle



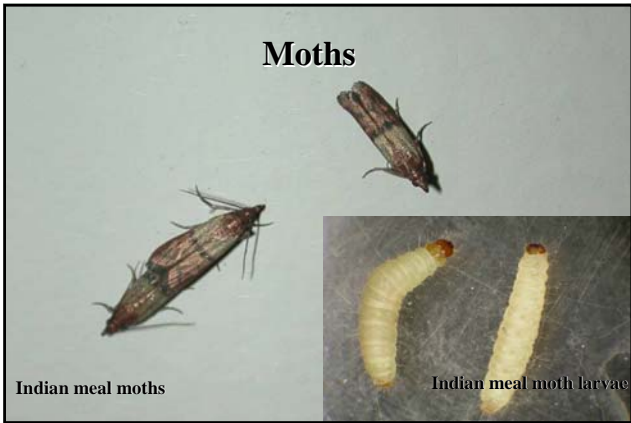
Drugstore beetle

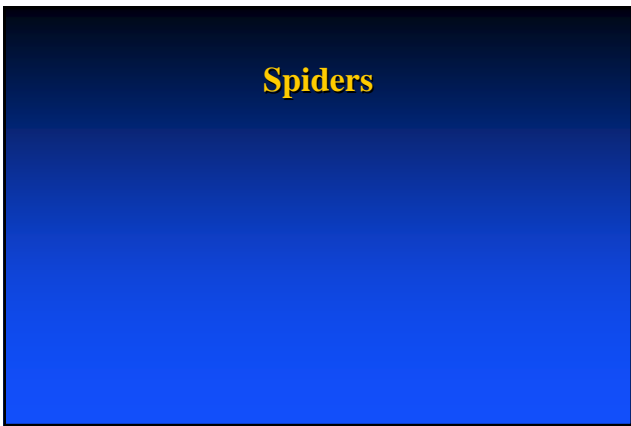
Weevils

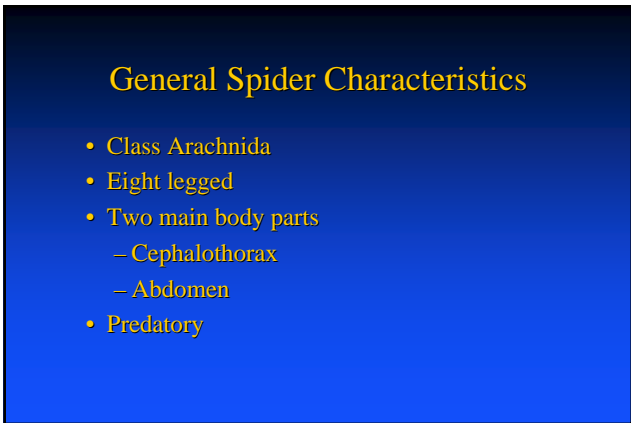
- Cowpea weevils
 - Feed on legumes such as dried beans and peas
 - Require whole legumes for larvae to develop



- Rice or maize weevils
 - Feed on grains like corn or rice
 - Require whole kernels for larvae to develop







Spider Types

- Occasional Invaders
 - Enter by accident
 - Enter due to environmental conditions
- “Domestic” Spiders
 - Seem quite at home in your home
 - Some species can be difficult to remove

Spider Lifestyles

- Hunting Spiders
 - Actively hunt or use ambush techniques
 - Don't spin webs to catch prey
- Web Spinners
 - Generally stationary
 - Use webs to catch and store prey



Occasional Invaders

- Most are hunting spiders
- Many are seasonal invaders
- Many are often noticed due to their roaming activity
- Some can also be large

Wolf Spiders



- Often large
- Fairly good eyesight
- Carry egg sac
- Carry spiderlings on their back

Trapdoor Spiders



- Live underground in burrows
- Males may wander after a rain
- May cause concern because of their large size

Jumping Spiders

- Generally small (1/8 – 3/4 of an inch)
- Generally prefer to hang around sunny areas such as windows
- Use webbing only as a retreat and for protection of egg sacs
- The more domestic species may spin these in curtain folds or over door frames





Occasional Invader Control

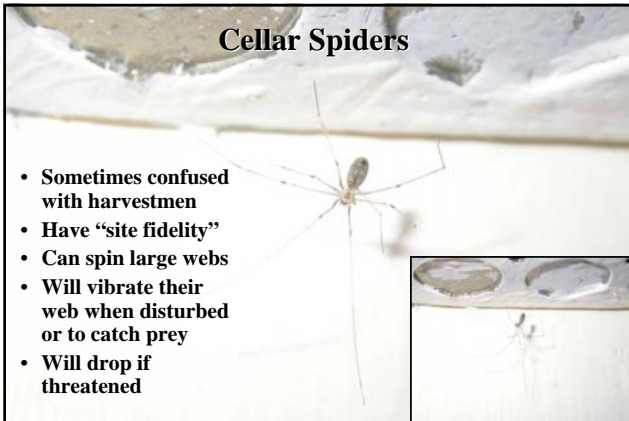
- Door sweeps to prevent spider entry
- Spray thresholds with residual chemicals
- Reduce humidity
- Reduce outdoor lighting and/or use yellow bug lights
- Remove spiders to outdoors or crush
- Chemical control often not needed

“Domestic” Spiders

- Web-spinners are most common
- More abundant in winter, but can take up residence at any time
- Most are stationary
- Some are reluctant to move once they have chosen a spot

Cellar Spiders

- Sometimes confused with harvestmen
- Have “site fidelity”
- Can spin large webs
- Will vibrate their web when disturbed or to catch prey
- Will drop if threatened



Comb-footed Spiders

- Family Theridiidae
- Spin “messy webs”
- Generally do better in areas of high humidity such as basements or crawl spaces
- Will use their web to store prey
- May make multiple webs – no site “fidelity”

House Spider

- Will move their nest until successful
- Wrap their prey and “save” it for later
- Can build large webs















Brown Recluse Control

- Carefully place sticky traps beneath beds, couches, etc. to find the most active hiding places
- Move beds away from the wall
- Remove dust ruffles from beds
- Decrease items on floor
- Examine items on floor before using – such as slippers, socks, etc.
- Professional help might be needed for chemical application

Giant Crab Spiders



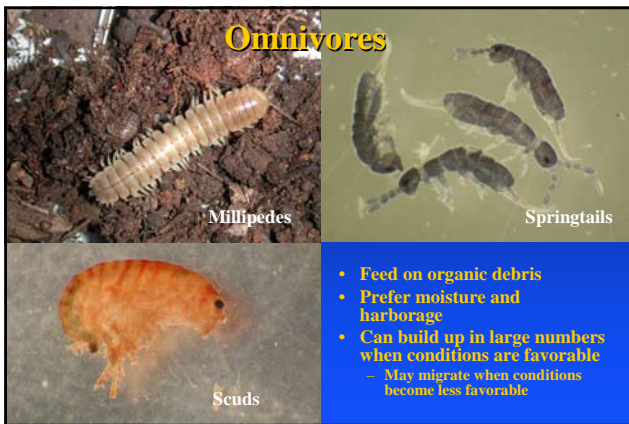
- No webs
- Actively hunt for prey
- Nocturnal hunters
- Menacing appearance
- Often scuttle sideways like a crab

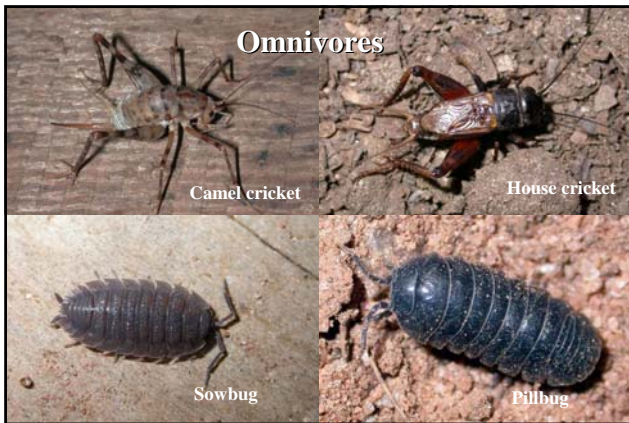
Domestic Spider Control

- Reduce humidity
- Use doorsweeps
- Vacuum webs and/or spiders
- Usually chemicals are not needed, but spiders can be sprayed directly

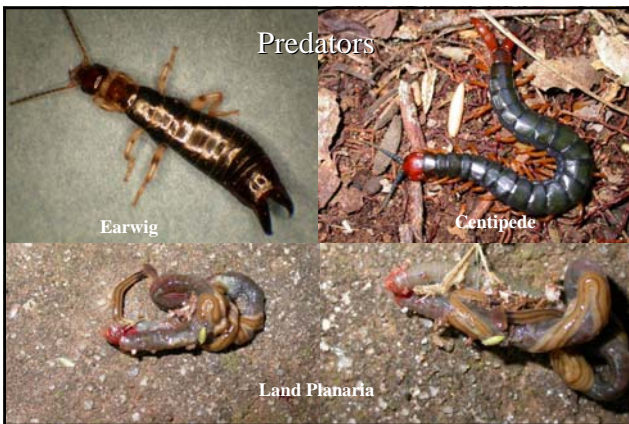
Occasional Invaders Control

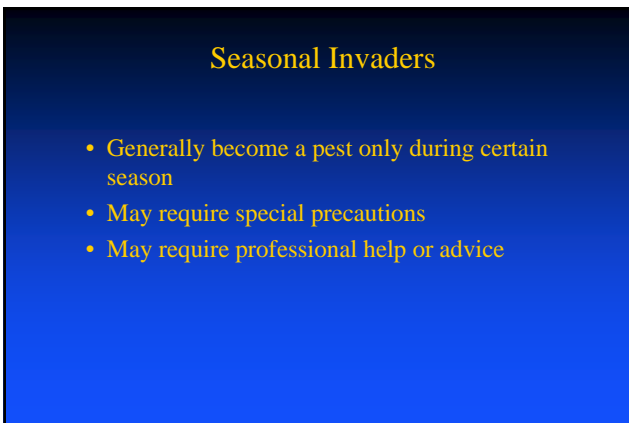
- Moisture management
- Decrease leaf litter, mulch and hiding places
 - Potted plants
 - Log piles
 - Landscape bricks and rocks
- Install doorsweeps
- Insecticides if needed
 - Across the threshold
 - Granulars for outside











Clover Mites

- Usually enter homes in fall
 - Spring entry may occur with new mulch
- Feed only on plants
 - Clover
 - Black medic
- Can be reduced by 90% with a grass free border of 18 inches around the foundation
- Perimeter treatments should reach up the foundation at least two feet for control
 - Treatments shouldn't be made in hot weather



Lady Beetles

- Beneficial insects
- Come indoors in Fall to hibernate
- Once inside, lady beetles shouldn't be sprayed
 - Dead lady beetles may attract secondary pests such as carpet beetles
- Physical exclusion is best
 - Exclusion should be done before fall: June or July
 - Homeowners may wish to consult an extension agent or a pest professional



Clothes Moths

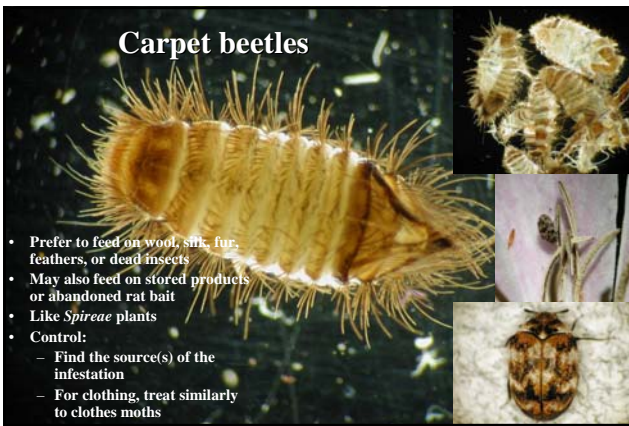
- Prefer to feed on wool, fur, or feathers
- Prefer dark, undisturbed, and hidden areas
- Control:
 - Inspection to find sources
 - Store infested items in closed containers with suitable repellent or freeze
 - Periodically inspect and air out susceptible items





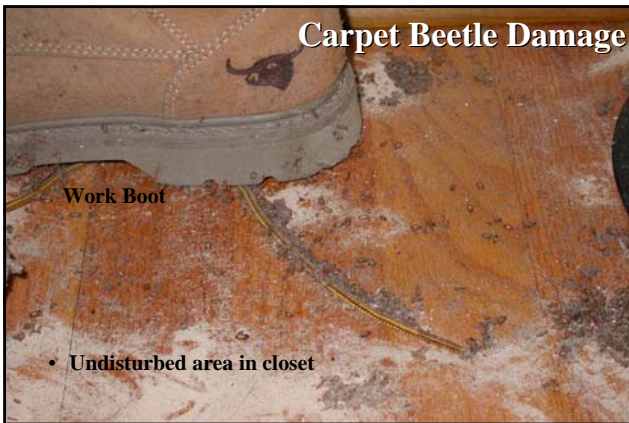
Boxelder Bugs

- Feed on Boxelder Trees
- Shouldn't be killed inside wall voids
- Not considered beneficial – population reduction is a viable control option
- The equipment and chemicals involved may require a professional



Carpet beetles

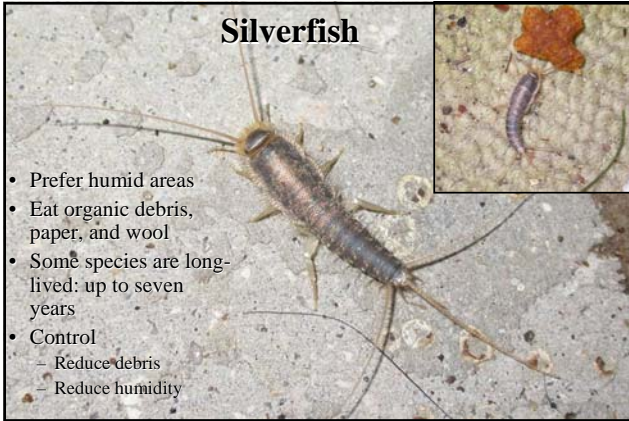
- Prefer to feed on wool, silk, fur, feathers, or dead insects
- May also feed on stored products or abandoned rat bait
- Like *Spiraea* plants
- Control:
 - Find the source(s) of the infestation
 - For clothing, treat similarly to clothes moths



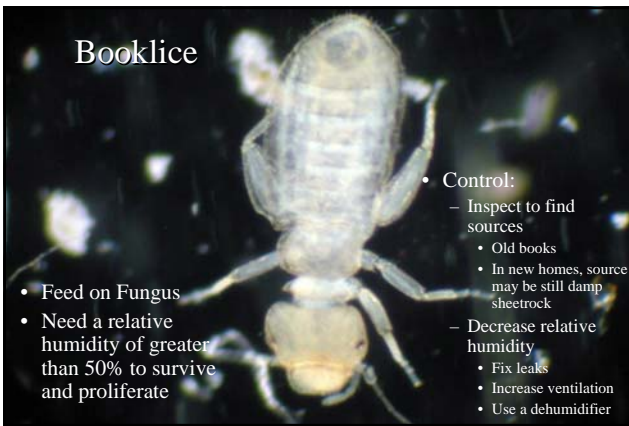
Carpet Beetle Damage

Work Boot

- Undisturbed area in closet



- Prefer humid areas
- Eat organic debris, paper, and wool
- Some species are long-lived: up to seven years
- Control
 - Reduce debris
 - Reduce humidity



- Feed on Fungus
- Need a relative humidity of greater than 50% to survive and proliferate
- Control:
 - Inspect to find sources
 - Old books
 - In new homes, source may be still damp sheetrock
 - Decrease relative humidity
 - Fix leaks
 - Increase ventilation
 - Use a dehumidifier