

US EPA ARCHIVE DOCUMENT

Ants – The #1 Pest in Schools Webinar



Photo: Joseph Berger at Bugwood.org

Center of Expertise for School IPM





Protecting Children in Schools from the Health Risks associated with Pests and Pesticides



Pesticide Safety, Integrated Pest Management and Your School

Center of Expertise for School IPM

IPM Basics

Pesticides

Physical & Mechanical
Controls

Cultural & Sanitation
Practices

Education &
Communication



Benefits of School IPM

- ▶ **Smart:** addresses the root cause of pest problems
- ▶ **Sensible:** provides a healthier learning environment
- ▶ **Sustainable:** better long-term control of pests



Presenters



Dawn Gouge, Ph.D.

- Associate Professor and Associate Specialist – Urban Entomologist
- University of Arizona, Department of Entomology.
- Integrated Pest Management (IPM) specialist since 1995.
- Will introduce IPM for ants, common ants pests, and their control .



Lawrence "Fudd" Graham, Ph.D.

- Research Fellow and Extension Specialist in the Entomology and plant Pathology Dept. at Auburn University.
- Involved in IPM since his college days and working with cotton.
- Will discuss management of fire ants that plague southern schools.



Daniel Suiter Ph.D.,

- Professor of Urban Pest Management at the University of Georgia.
- Development of extension, research and education programs on the management of structural household pests.
- Will show us how to identify and control carpenter ants.



Fred Remelius,

- Director of Operations at the Upper Merion Area (PA) School District.
- 35 years of experience in Facilities Management.
- BS in Civil Engineering and MBA from Queens Univ.
- Will discuss his district's ant challenges and the IPM practices.



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Ants the #1 Pest in Schools



Dawn H. Gouge, University of Arizona

Lawrence 'Fudd' Graham, Auburn University

Dan Suiter, University of Georgia

Frederick Remelius, Upper Merion Area School District

EPA Center of Expertise for School IPM



Bite



Sting



...Or both!!

Astonishing and Amazing Ants

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- Recorded species: >12,500
- Estimated 20,000 species ~ 700 in the US
- Use pheromones to communicate (ant trails)
- Social insects that undergo complete metamorphosis
 - ▣ Females (workers, soldiers, and queens)
 - ▣ Males (drones)
- Ecologically significant



Antastic 20%!

10

- Differences in diet, nesting and behavior
 - ▣ Slave-raiding
 - ▣ Vampirism
 - ▣ Fungal cultivation
 - ▣ Suicidal acts to protect colony
 - ▣ Blockading
 - ▣ Raft forming
 - ▣ Herding
 - ▣ Building
 - ▣ Honey potting



One Size Fits One Ant

11

- Because of these great differences, effective management strategies differ enormously



Ant or Termite?

12

□ Ants

- Elbowed antenna
- Skinny waist

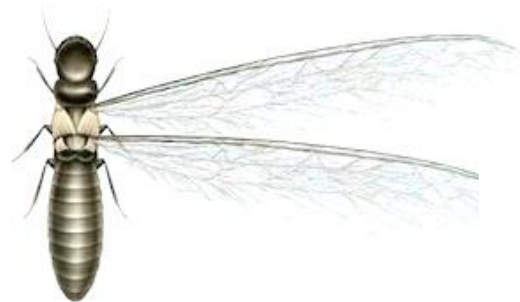
Flying Ant



□ Termites

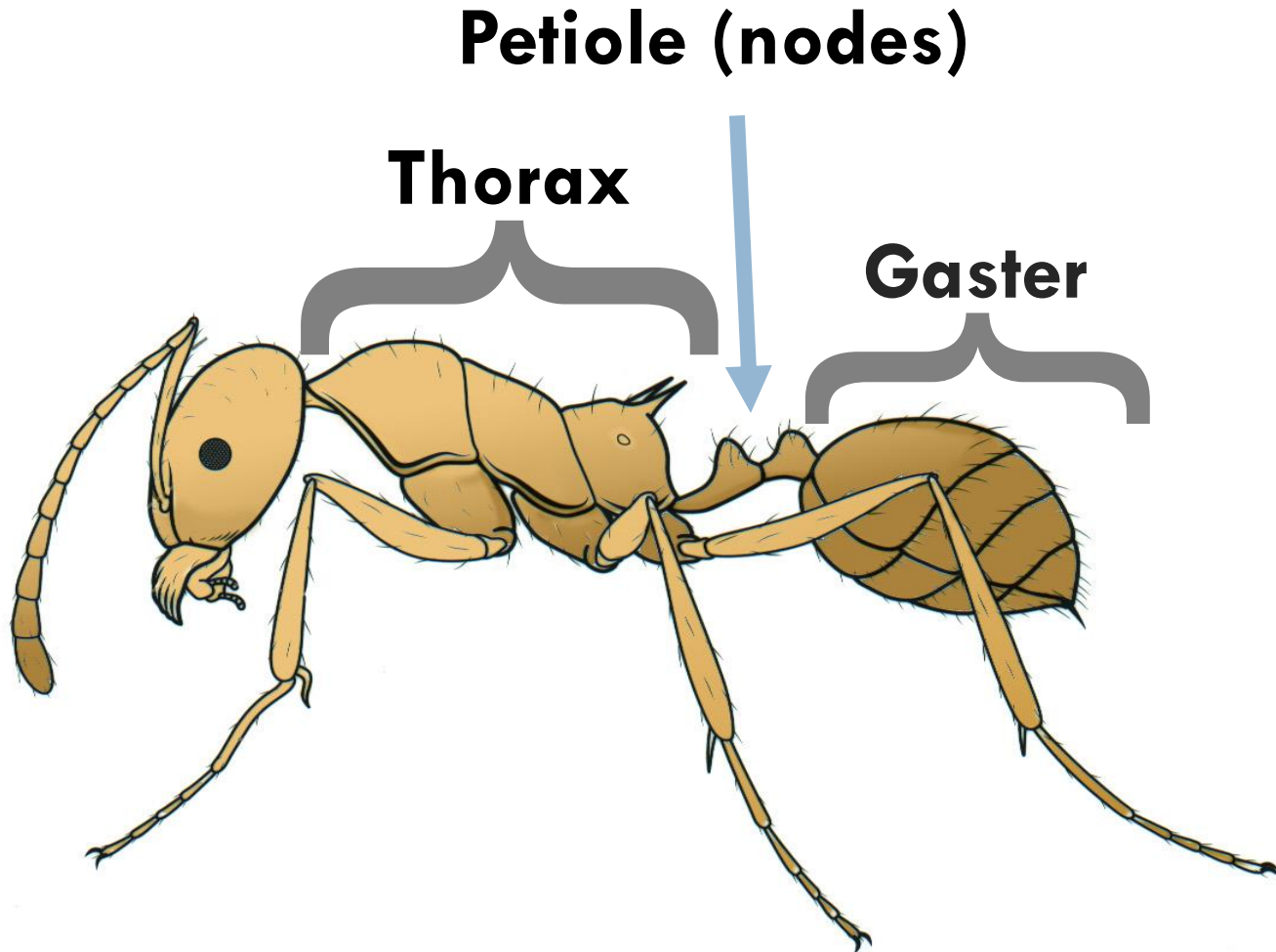
- Straight antenna
- Thick waist
- Equal wing size

Flying Termite



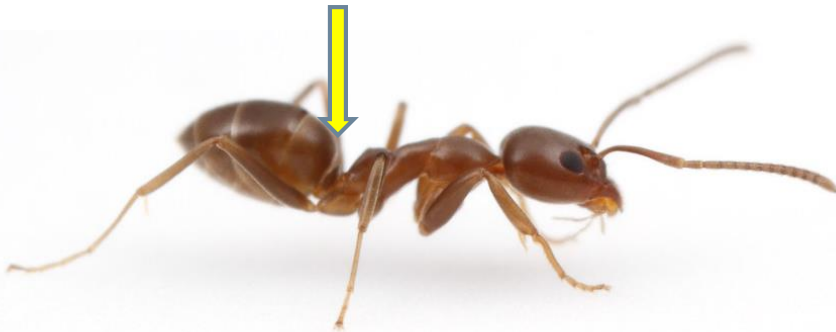
Basic Ant Anatomy

13



1 Node vs. 2 Node Ants

14



Argentine



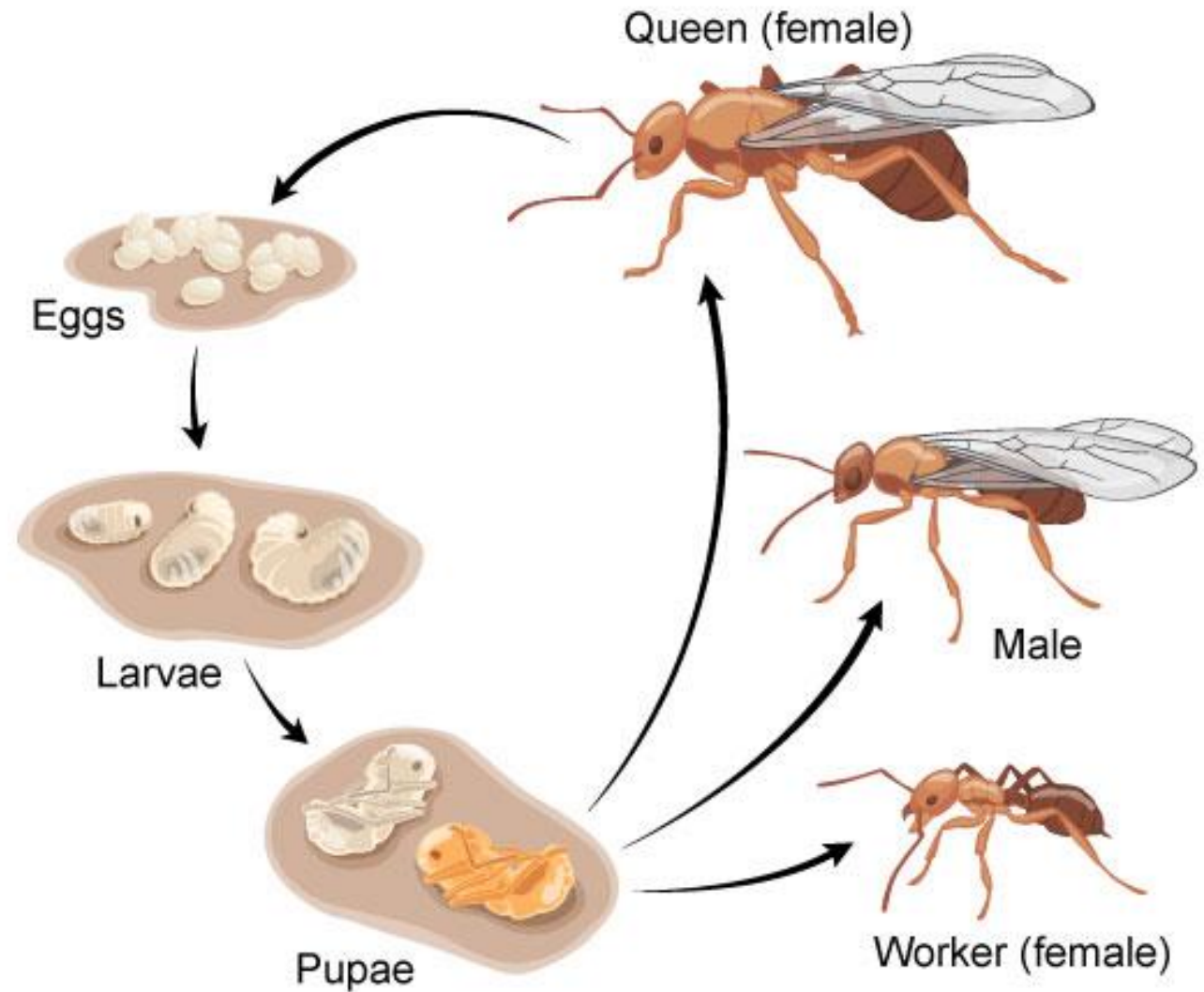
Leaf cutter

© Alex Wild
alexanderwild.com

© alexanderwild.com

Life Cycle

15



Cute Queens

16

Queens are relatively large, with 3 spot “crown” between her compound eyes



Camponotus Carpenter ant

Oviposition - Egg laying

17



Larvae (brood)

18



Food Sharing

Trophallaxis



Pupae (exarate or in a cocoon)

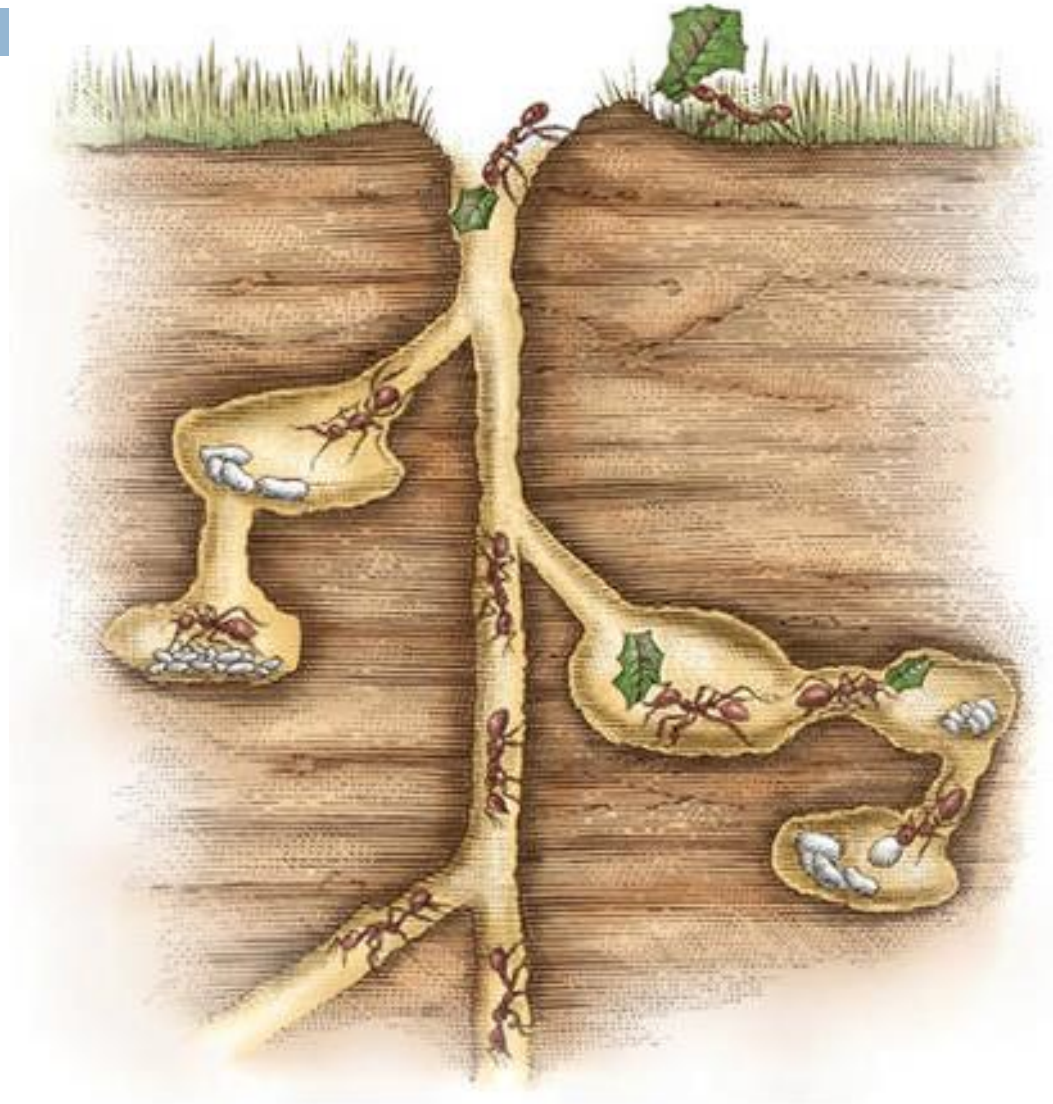
20



Ecological Services

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- ❑ Soil aerators
- ❑ Decomposers
- ❑ Soil compilers
(nutrient
accumulation)



Ant Interactions

22

- ❑ Ants and plants
- ❑ Ants and aphids
- ❑ Seed dispersal



Collecting Ants for Identification

23

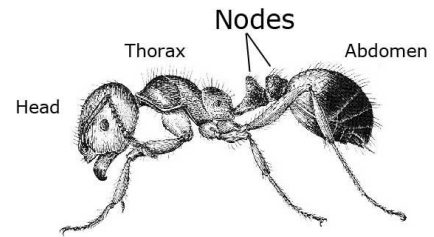
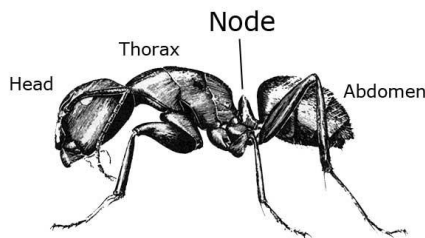
- ❑ Vials with 95% ethyl alcohol
- ❑ Hard plastic container, put in the freezer overnight
- ❑ Collect with a paintbrush or scoop them up



Common Ants (there are more)

24

- ☐ Argentine
- ☐ Allegheny Mound
- ☐ Carpenter
- ☐ Citronella
- ☐ Crazy
- ☐ Caribbean crazy
- ☐ White-footed
- ☐ Field
- ☐ Ghost
- ☐ False honey
- ☐ Velvety tree
- ☐ Cornfield
- ☐ Odorous house
- ☐ Pyramid
- ☐ Rover
- ☐ Pavement
- ☐ Pharaoh
- ☐ Fire
- ☐ Thief
- ☐ Harvester
- ☐ Acrobat
- ☐ Big-headed
- ☐ Little black
- ☐ Leaf-cutter



Identification: Knowledge is Power

25

Determining ant species will tell you:

- Food preferences
- Where they are nesting
- If they are a problem
- How to management if they are a pest
 - ▣ Tramp
 - ▣ Stationary
 - ▣ Nomadic



Ant Population Management

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- ❑ Inspect and monitoring
- ❑ Identify
- ❑ Sanitation/Physical/Mechanical
- ❑ Exclusion
- ❑ Heat/Cold
- ❑ Cultural
- ❑ Biological Control
- ❑ Chemical



Find the Source

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- The best way to treat is at the colony nest site
- Spraying individual ants is not effective



It's You or the Ant Queen

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Ant Population Management

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Chemicals

■ Baits

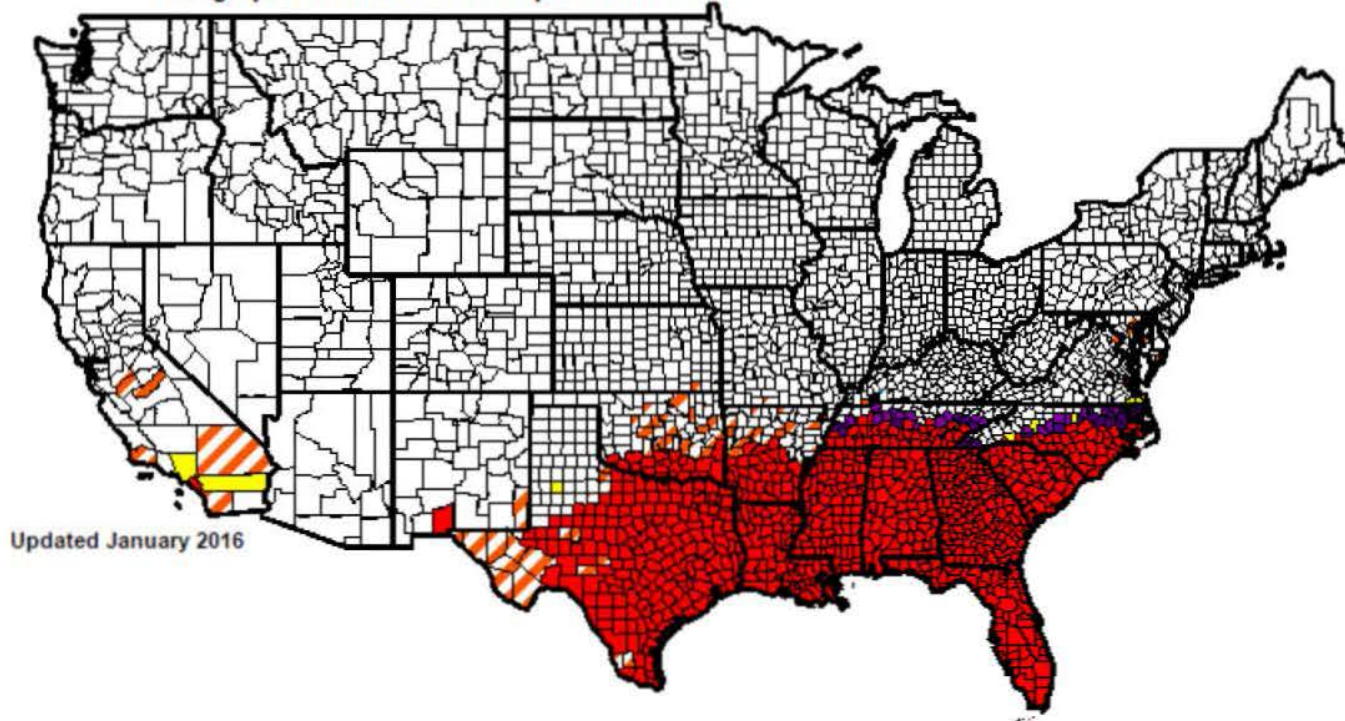
- Pre-Baiting
 - Direct Kill (Best If Slow)
 - Insect Growth Regulators (Slow)
 - Secondary Poisoning (Trophallaxis)
 - Size Of Particles (Important)
 - Sugar/Oil/Protein (Variable)
- ### ■ Preference is ant specific and activity specific



Fire Ant Management Using Baits



Geographic Distribution of Imported Fire Ants



<http://www.arcgis.com/apps/StorytellingTextLegend/index.html?appid=431bbae8faac418b87bb4ef3d7b66644>

Fire Ant Biology

- 🐜 Must know the biology of your insect to know how to manage it
- 🐜 Most don't use baits because they do not understand fire ant biology and how baits work

Colony Establishment

🐜 Mating flights by alates

🐜 24 -48 hrs after rain

🐜 Newly mated queen, most vulnerable fire ant form:

🐜 environment

🐜 poor judgment (pools, etc.)

🐜 predators



Photo by: I, Lamiot



Photo from Invasion of the Red Imported Fire Ant, Amer. Entomol., 1997

Colony Establishment

- 🐜 New colony founded by single female
- 🐜 Removes wings, burrows 2-6 in, seals burrow
- 🐜 Lays 10-20 eggs, hatch 6-10 days



Colony Establishment



After one month
workers:
open mound
begin foraging
begin construction

Queen production
now several hundred
eggs / day



🐜 For the first 3 months, mound may not be visible

🐜 Mounds “disappear” during drought or if disturbed



🐜 Ants may not rebuild until there is new moisture, so difficult or hard to find.

🐜 New mounds “appearing” after a rain were already there



🐜 Below ground, a mature ant colony can encompass about 300 feet of underground tunnels

🐜 The hilly mounds of dirt where fire ants make their home are actually solariums that collect heat to warm its residents in cool weather

Workers

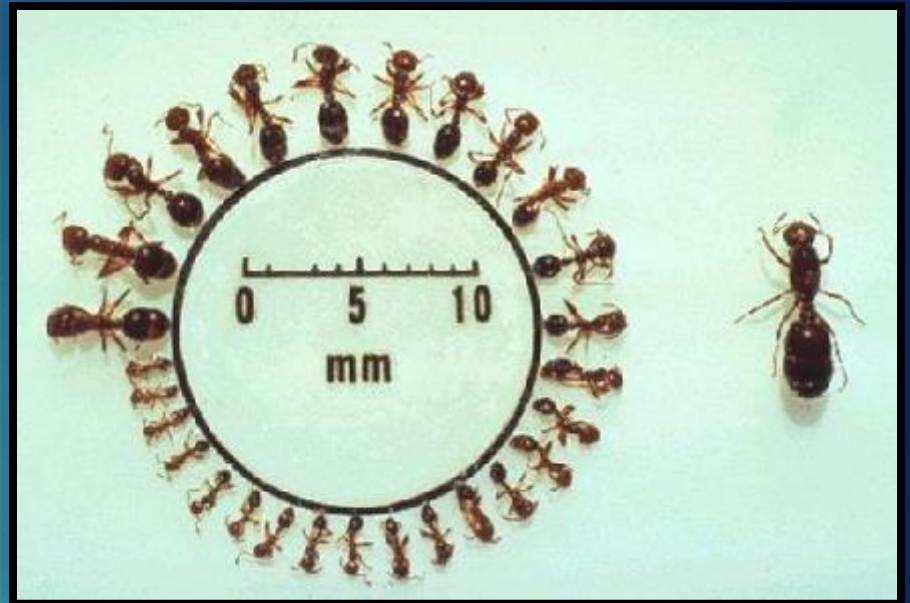
🐜 Workers range in size and have specific functions/duties

🐜 Function depends on age & colony needs

🐜 Nurses

🐜 Reserves

🐜 Foragers



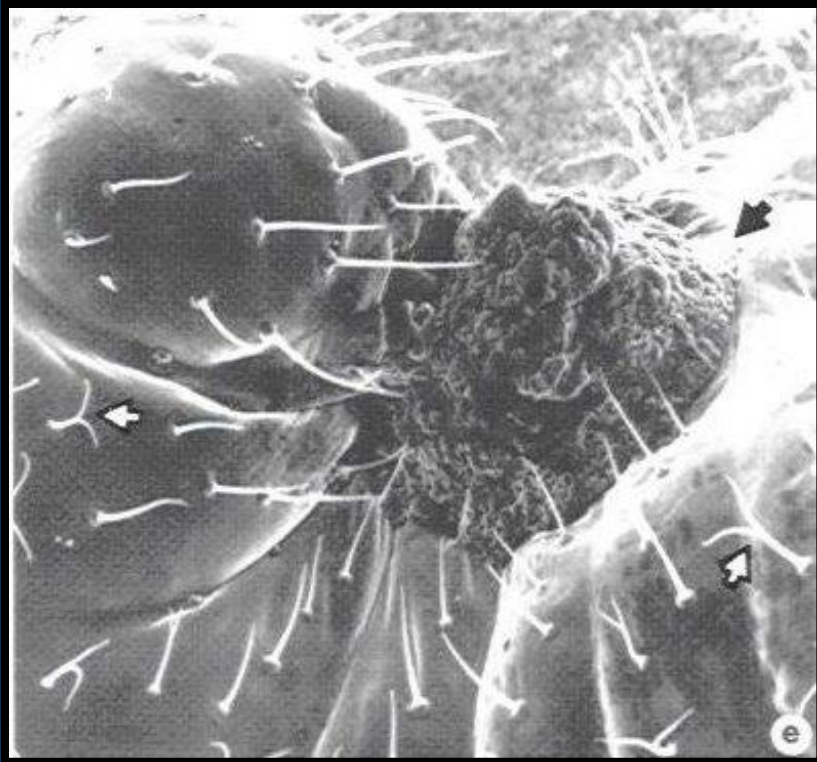
Development



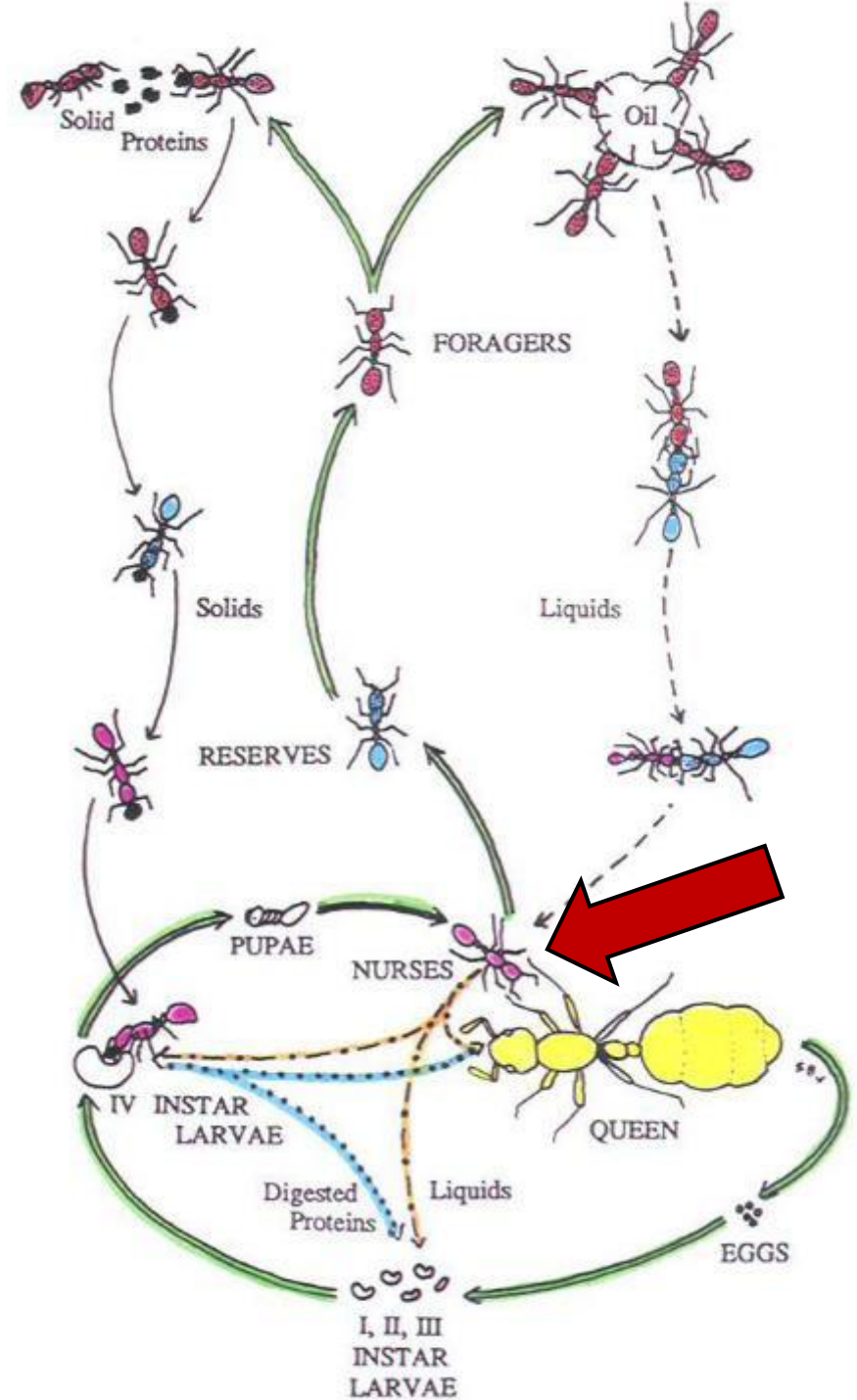
- Complete Metamorphosis
- "White stuff"
- Egg to Adult 28-41 days
- Worker longevity
 - Small 60-90 days
 - Large 90-150 days



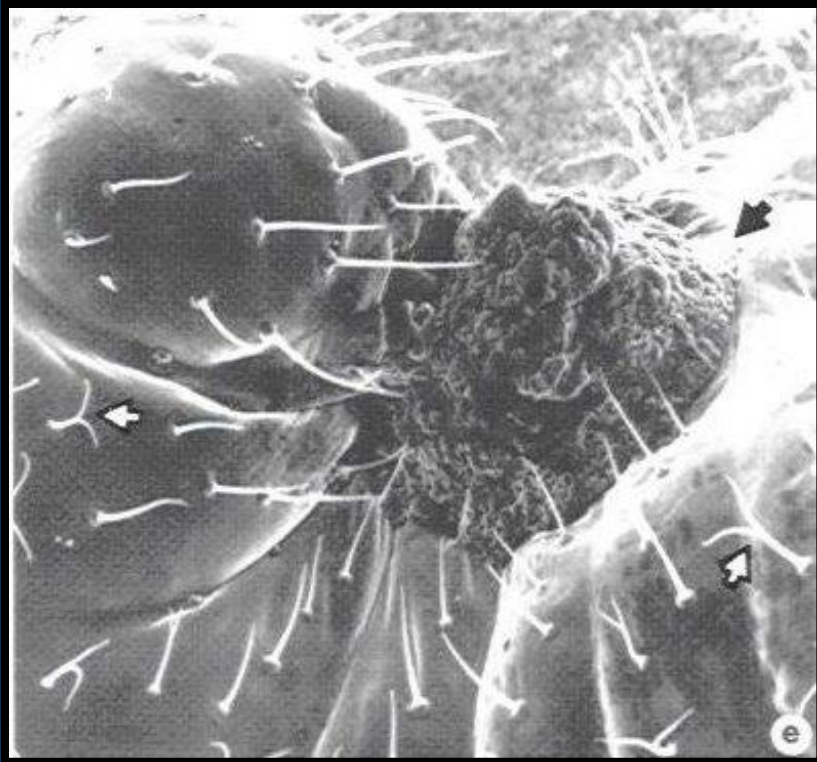
Liquid Food vs. Solid Food



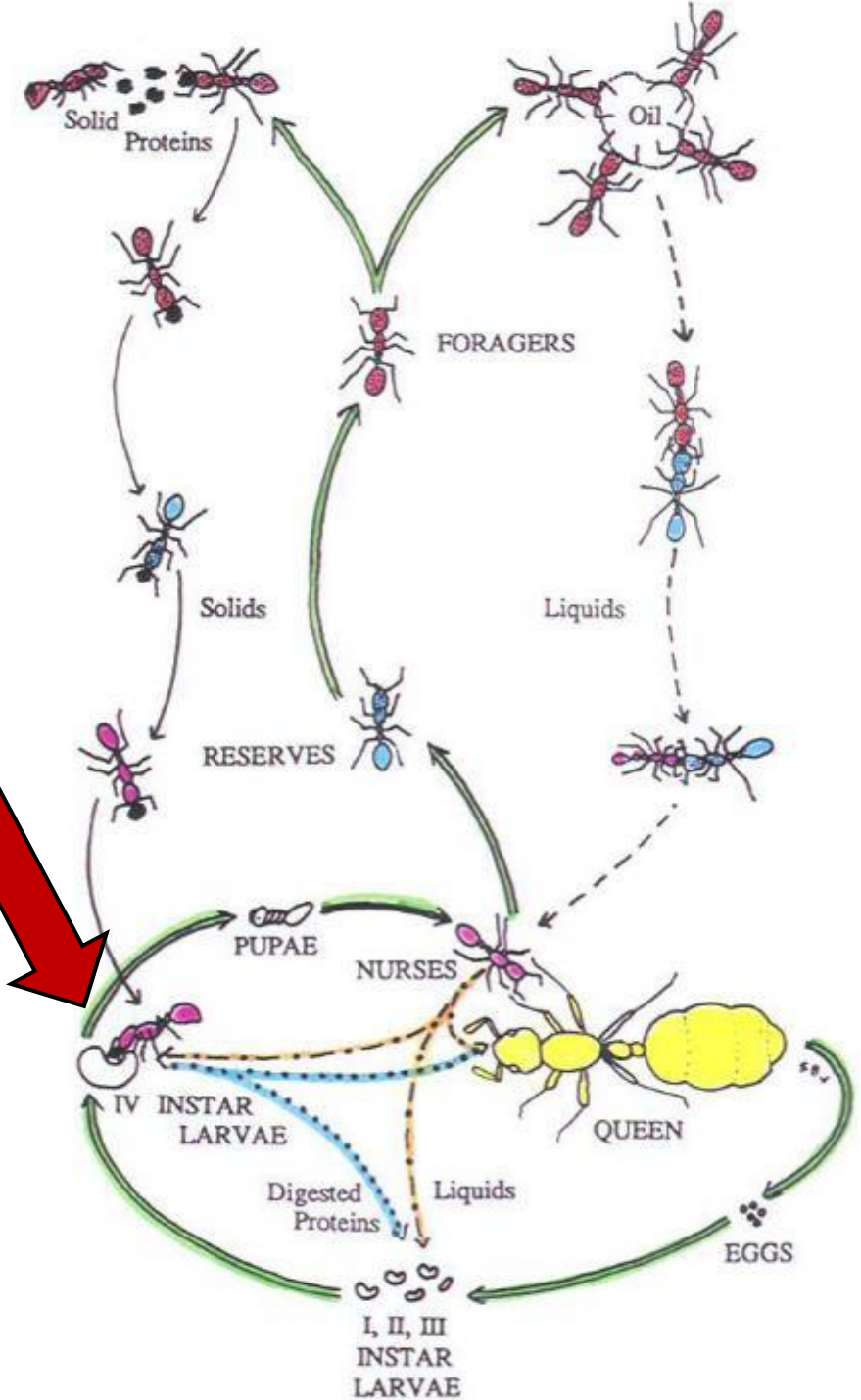
 4th instar larvae



Liquid Food vs. Solid Food



 4th instar larvae



Types of Fire Ant Management

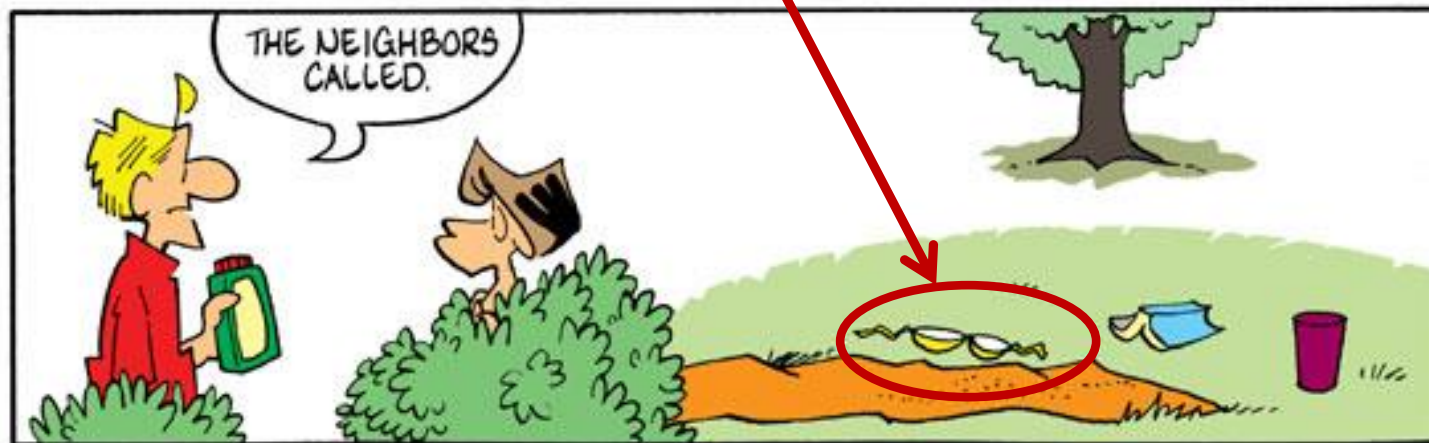
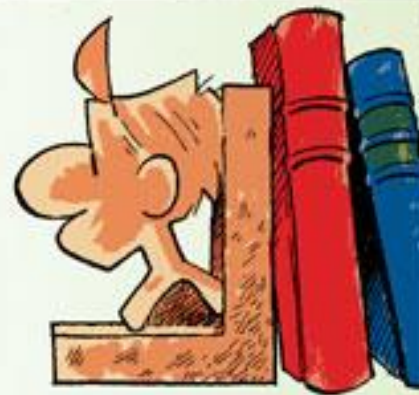
Proactive

Reactive

Arlo Janis



Arlo Janis



Integrated Pest Management

- 🐜 Management is site specific
- 🐜 No single strategy is best for all situations
- 🐜 Treat fire ants after spring mating flights
- 🐜 Focus on gradual, rather than fast removal
- 🐜 Slow acting baits give longer lasting control

Fire Ant Control with Insecticides

- 🐜 Fast-acting residual contact insecticides
 - 🐜 Targeting foragers
 - 🐜 Limited contact to colony and queen
 - 🐜 Residual activity depends on rate, weather
 - 🐜 Can be granular or liquid
- 🐜 Baits
 - 🐜 Targets colony and queen
 - 🐜 Take longer to kill colony
 - 🐜 Have bioresidual effect
- 🐜 Slow acting baits give longer lasting control

Fast-acting, residual contact insecticides

Individual Mound Treatments (granular and liquid)

🐜 Advantages

- 🐜 Speed of Control
 - 🐜 Generally fast acting
- 🐜 Ease of Use
- 🐜 Minimize residues

🐜 Disadvantages

- 🐜 Number of Mounds
 - 🐜 Time to search & treat
- 🐜 “Invisible” colonies
 - 🐜 Young, hot-dry, tall grass
- 🐜 Access to entire mound
- 🐜 Hauling liquid/mixing
- 🐜 Not as effective in hot weather



Photo by Vicky Bertagnolli

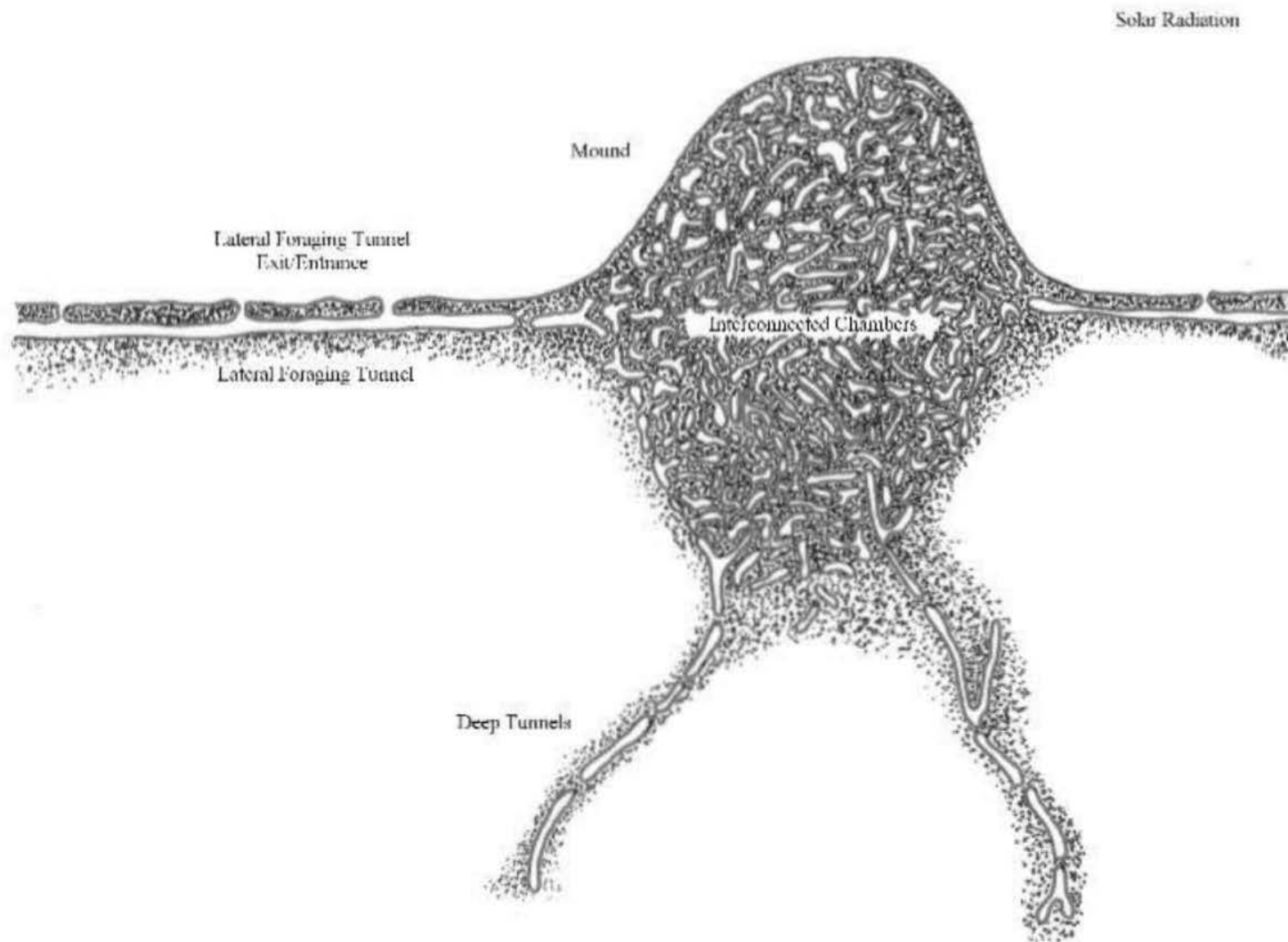


Photo from Invasion of the Red Imported Fire Ant, Amer. Entomol., 1997

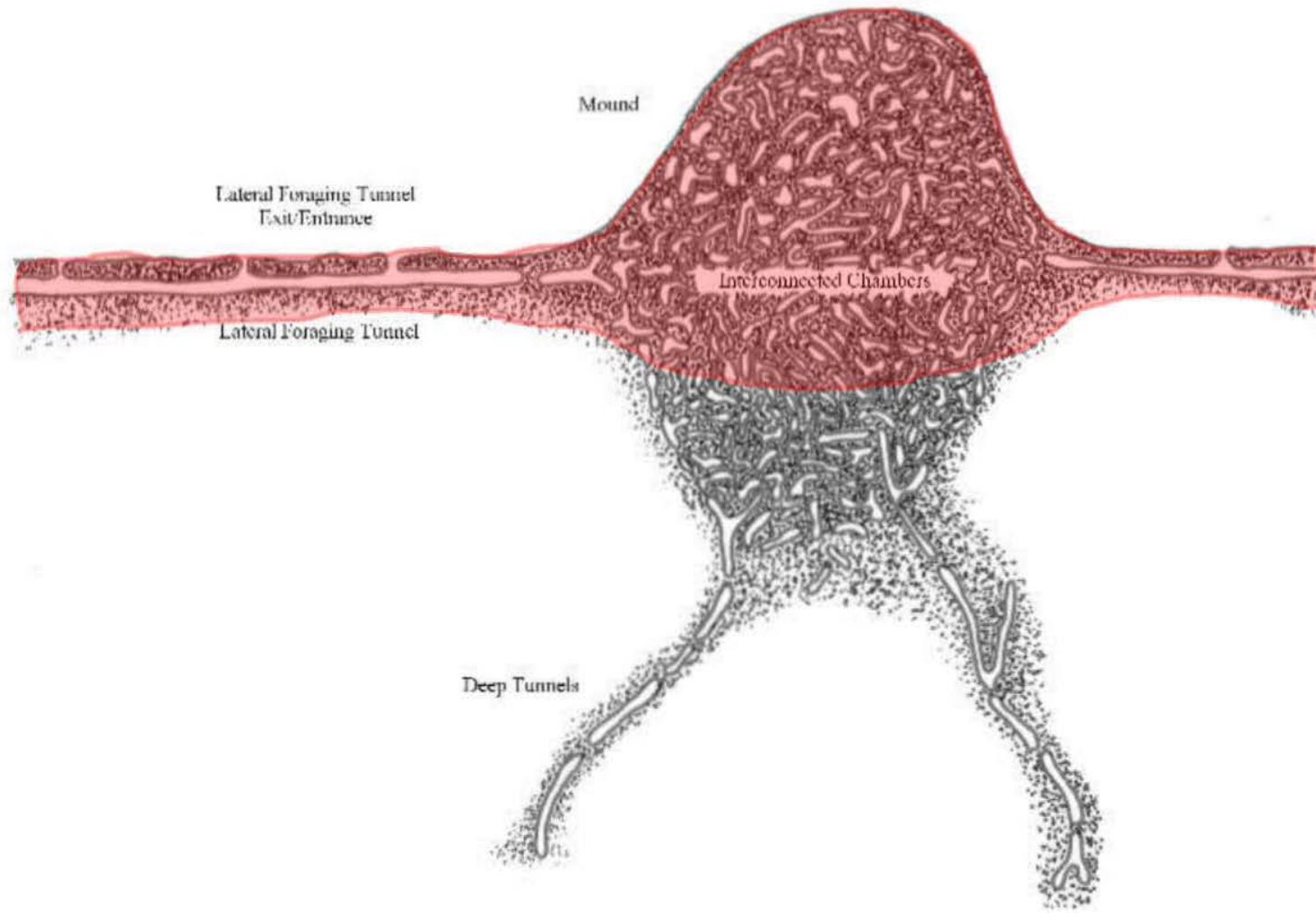


Photo from Invasion of the Red Imported Fire Ant, Amer. Entomol., 1997

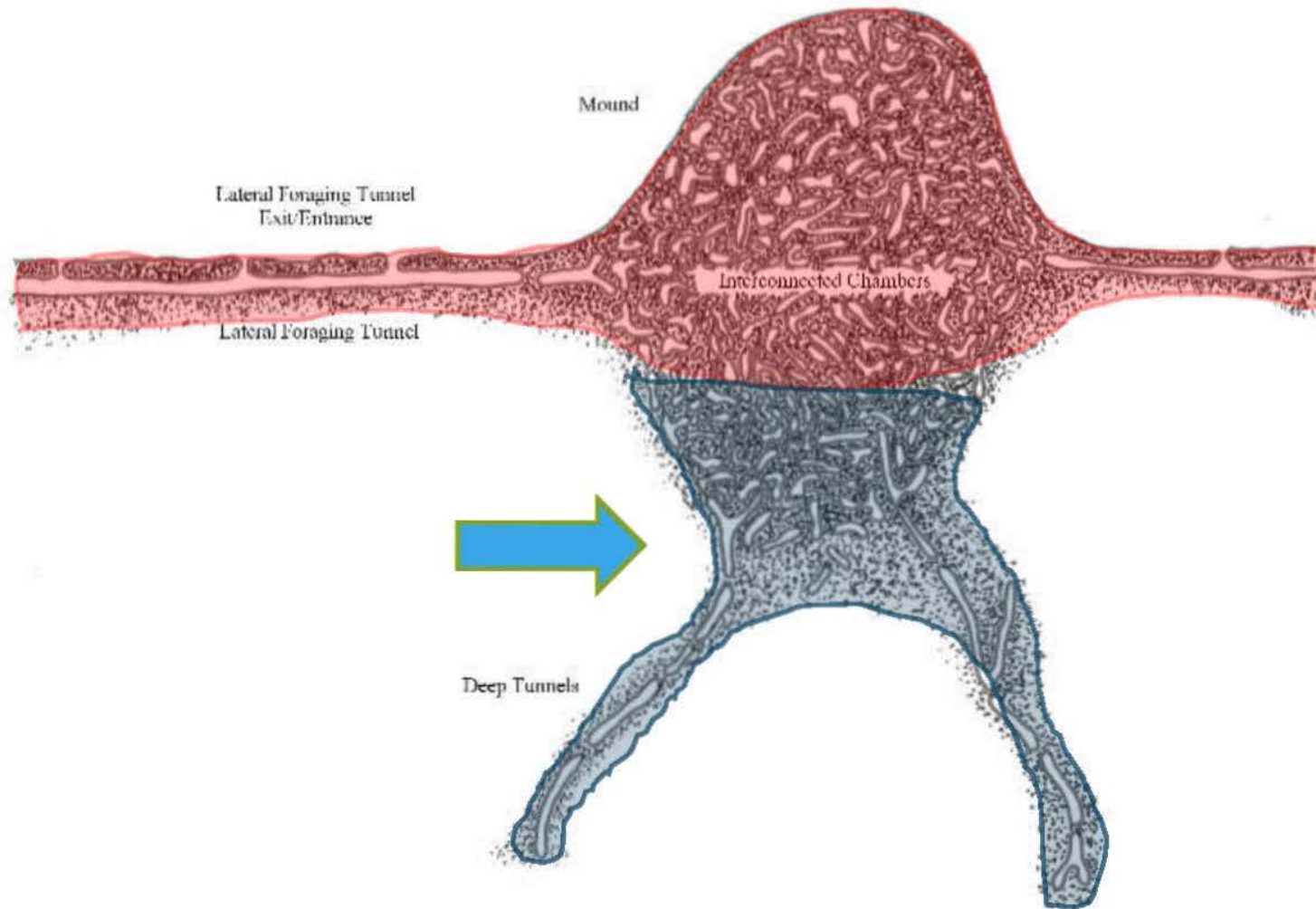


Photo from Invasion of the Red Imported Fire Ant, Amer. Entomol., 1997

Solar Radiation

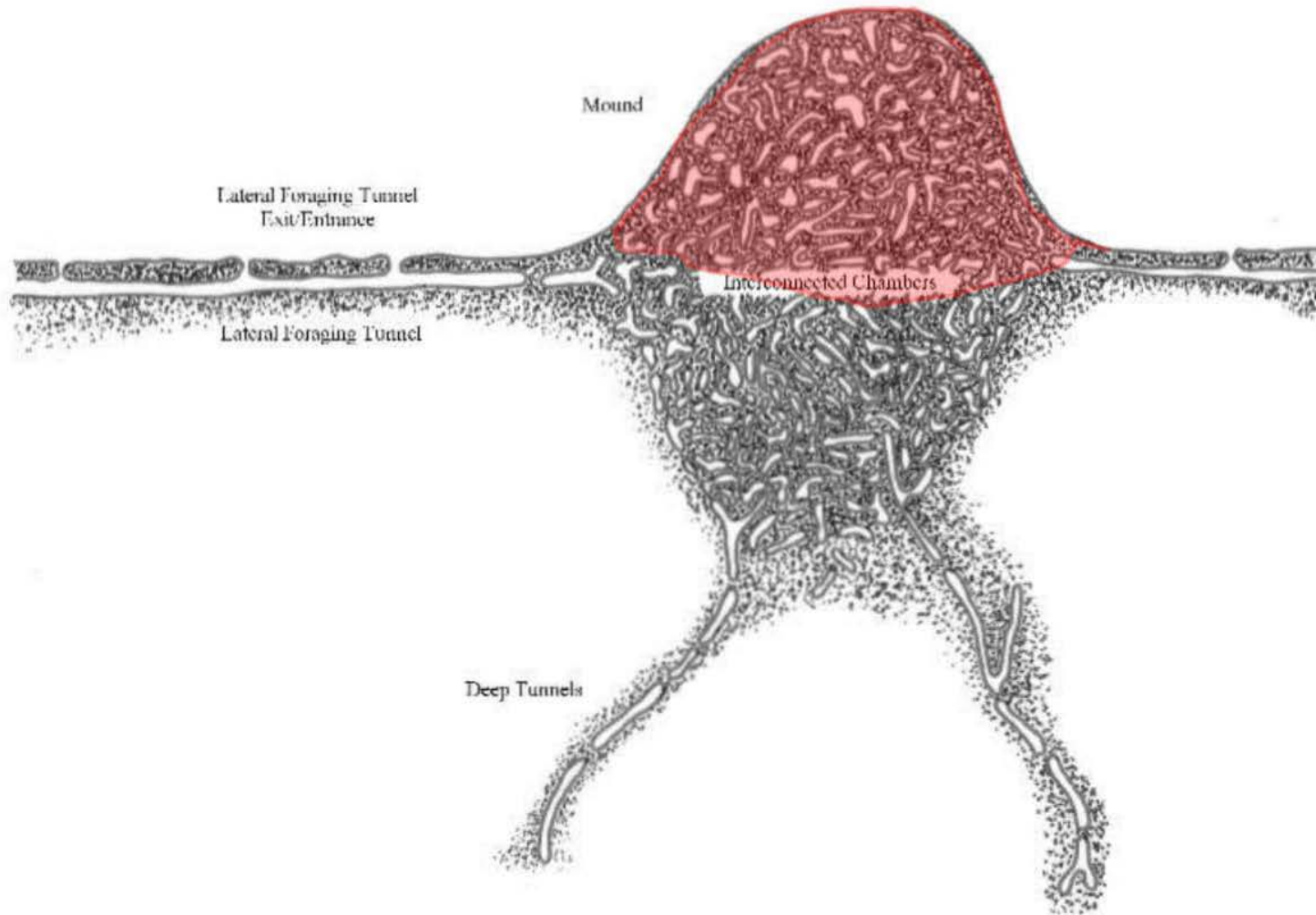


Photo from Invasion of the Red Imported Fire Ant, Amer. Entomol., 1997

Fast-acting, residual contact insecticides

Broadcast (granular and liquid)

Advantages

-  Slows re-infestation for a month or so (dependent on rate & activity of residual)
-  Usually, rapid colony control

Disadvantages

-  Complete coverage of area
-  May need to be watered in
-  Residues in sensitive areas
-  Most are non-selective
-  Faster reinfestation once residue dissipates

Fire Ant Baiting

Advantages

-  Utilizes natural behavior of ants to distribute toxicant to colony
-  Efficient to apply
-  Small amount of insecticide/growth regulator used
-  Low cost
-  Active ingredient carried to mound by ants
-  Little or no residue

Disadvantages

-  Timing application to foraging behavior, can be inconvenient
-  Colony control requires 1 to 8 weeks
-  Difficult to apply at low rates without proper equipment

What is a fire ant bait?

What is a fire ant bait?

Carrier



What is a fire ant bait?

Carrier + Attractant



+



What is a fire ant bait?

Carrier + Attractant + A.I.



+



+



What is a fire ant bait?

Carrier + Attractant + A.I. = Bait



+



+



=





Must make sure that the label says Fire Ant Bait!

Metabolic/Nervous System Inhibiting Als in Baits

 Hydramethylnon: 1 - 4 weeks

 Amdro[®], Amdro Pro[®], MaxForce[®] Complete Granular Insect Bait

 Spinosad: 3 days - 2 weeks

 Greenlight[®] Fire Ant Control with Conserve, Fertilome[®] Come and Get It, Payback[®] Fire Ant Bait

 Abamectin: 1 - 4 weeks

 Award II[®], Ascend[®]

 Fipronil: 2 - 4 weeks

 Maxforce[®] FC Fire Ant Bait

Metabolic/Nervous System Inhibiting Als in Baits

☛ Indoxacarb: 2 - 5 days

☛ Advion®

☛ Metaflumazone: 3 - 14 days

☛ Siesta®

Growth Regulators

 Pyriproxifen: 4 - 8 weeks

 Distance®

 Methoprene: 8 - 12 weeks

 Extinguish®

Product mixture

 Methoprene and Hydramethylnon

 Extinguish Plus[®], Amdro Firestrike[®] Mound Treatment

 2 - 4 weeks

 plus extended control (bioresidual)

What is “Bioresidual”?

Overall killing power of an insect control technology including the direct effects of the technology (i.e., chemical residual) **PLUS** the associated natural biological mortality.

Ellsworth & Martinez-Carrillo, 2001



Broadcasting Bait





Bait Application

-  Apply at temperatures between 70° and 85° F
-  Applications made during the hot days of summer should be made late afternoon or early on a morning with no heavy dew.
-  Do not apply if rain is expected within 4 - 12 hours
-  Store bait in a cool dry place
-  Do not store bait with pesticides, gasoline or other volatile chemicals
-  Buy only what you will use each year – bait will go rancid

Bait Application

-  Broadcast only during warmer months
 -  April 15 - October 15
-  Can do individual mound treatments year round, but only on warmer days during the winter months
-  Can mix with fertilizer if application is made immediately after mixing

Why aren't baits used more?

-  Want immediate control - yesterday
-  Don't understand how they work
-  Confused with granular insecticides
-  Difficult to apply at label rates without proper equipment
-  Application timing can be inconvenient

So, why should I use baits?

- 🐜 Safe products
- 🐜 Low amount of active ingredient used
- 🐜 Fire ants do the work for you
- 🐜 Utilize natural behavior of ants to distribute toxicant to colony
- 🐜 Kill the queen in addition to the workers
- 🐜 Inexpensive
- 🐜 Relatively no residual
- 🐜 Slow kill results in slower reinfestation

Questions



grahalc@auburn.edu

http://www.extension.org/fire_ants

Carpenter Ant Biology and Baiting

Dan Suiter

University of Georgia Griffin Campus
Department of Entomology
Griffin, GA 30223-1797

770-233-6114; dsuiter@uga.edu
gabugs.uga.edu



Photo: Susan Ellis at Bugwood.com

Important Aspects of Carpenter Ant Biology



Photo: David Cappaert at Bugwood.com

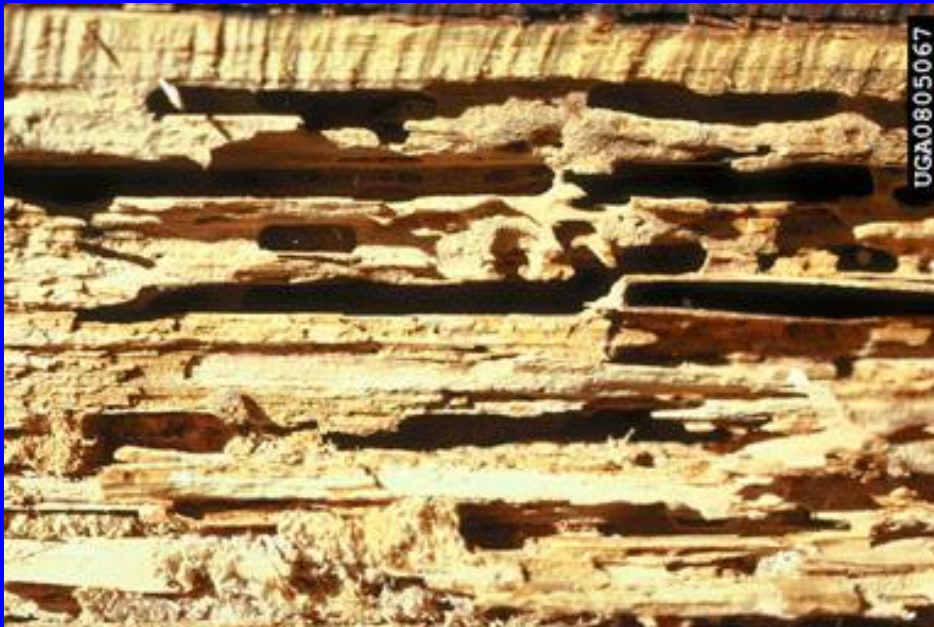
Black Carpenter Ant

Camponotus pennsylvanicus



- Chews wood, but does not eat it (sawdust)
- Outdoors, nests in trees; create permanent trails
- Active at night
- Control
 - Find colony or most likely site; provide gel or granular bait

Carpenter Ant Damage



*Photo above: R. Werner at Bugwood.com;
right: Art Cushman at Bugwood.com*



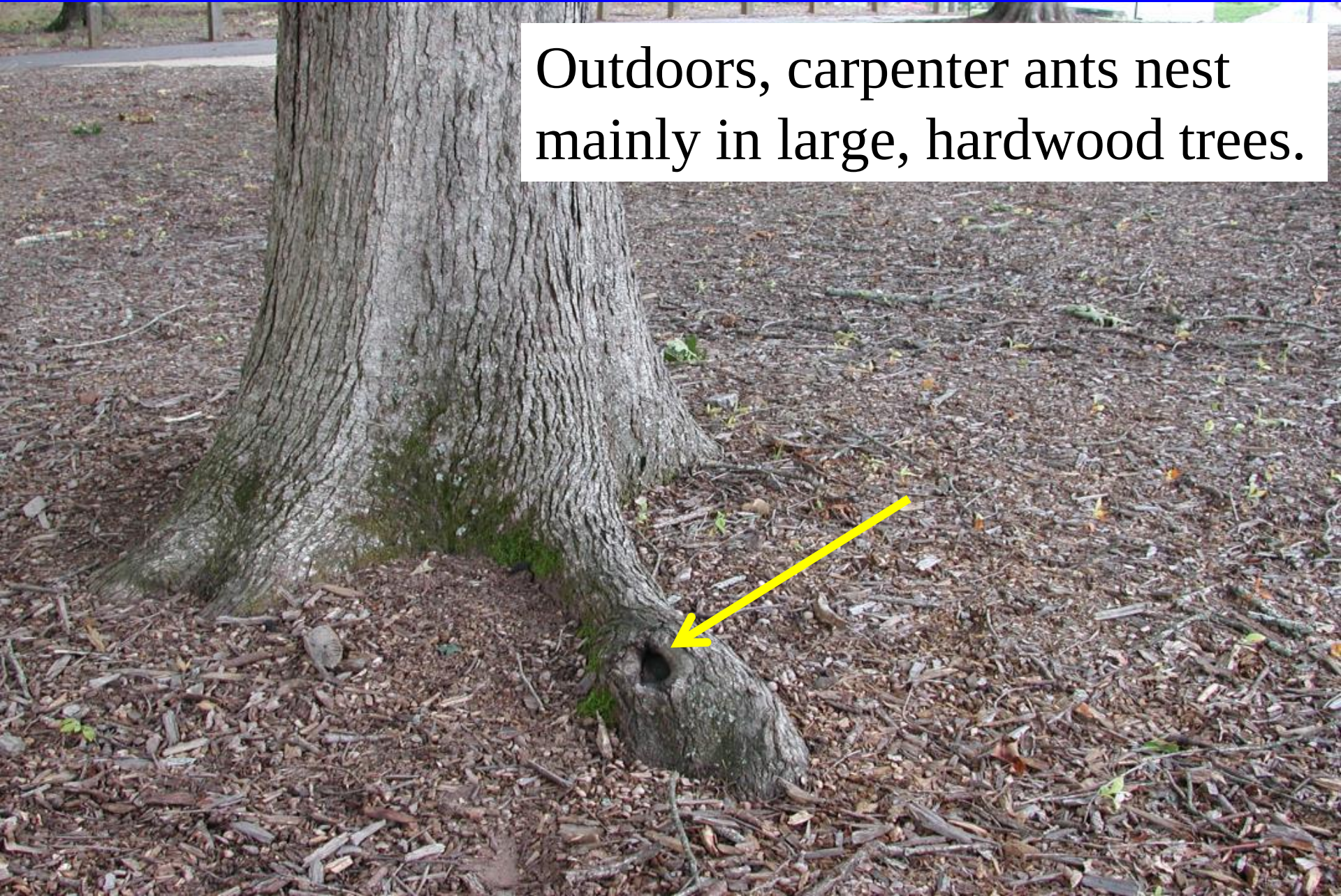


“Sawdust” from nest cleaning

A photograph of a large, mature tree trunk with rough, grey bark. A prominent vertical crack runs down the center of the trunk. The background shows other trees with autumn-colored leaves in shades of orange, red, and brown. A blue car is visible in the distance on the left side. The sky is overcast and grey.

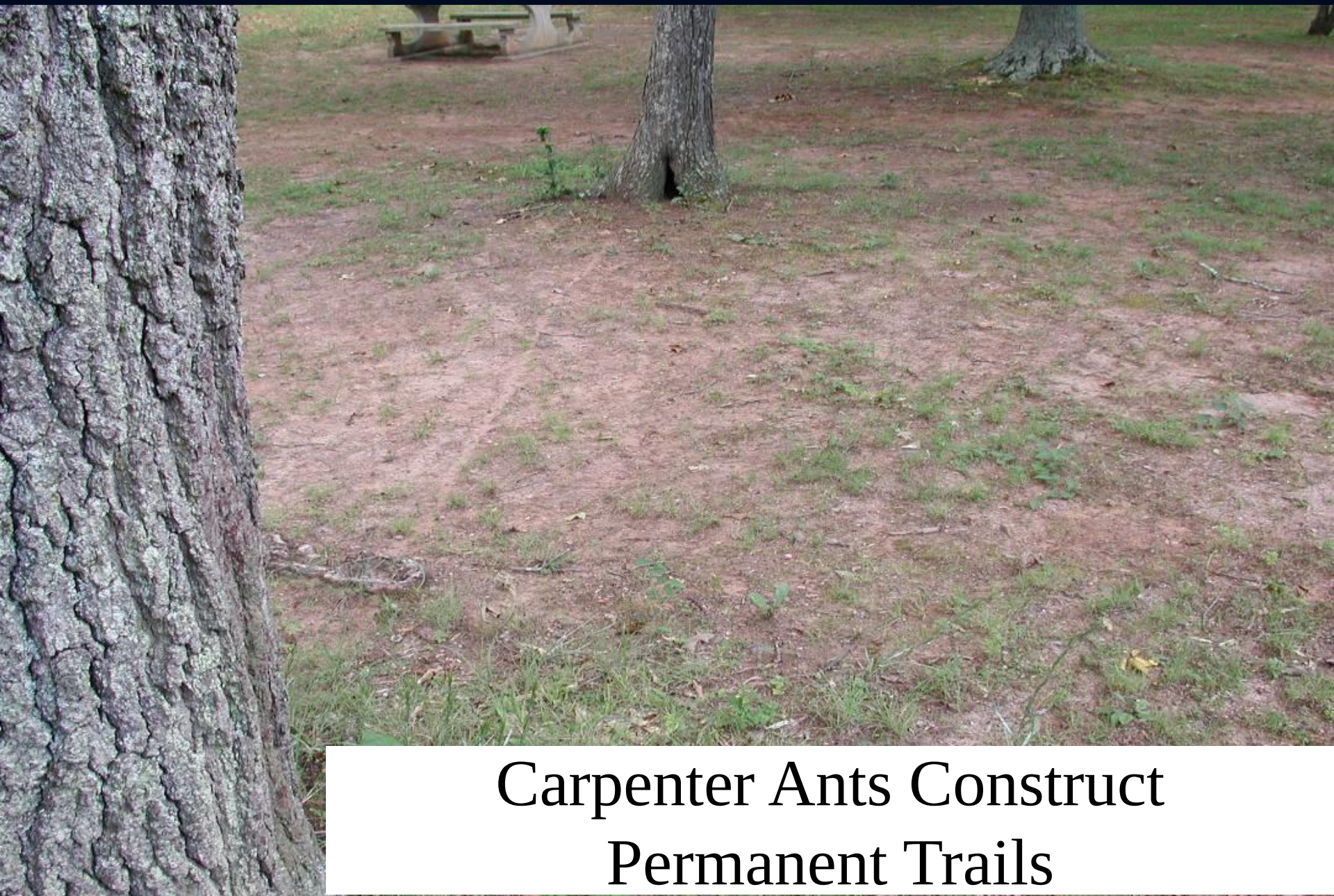
Outdoors, carpenter ants nest
mainly in large, hardwood trees.

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

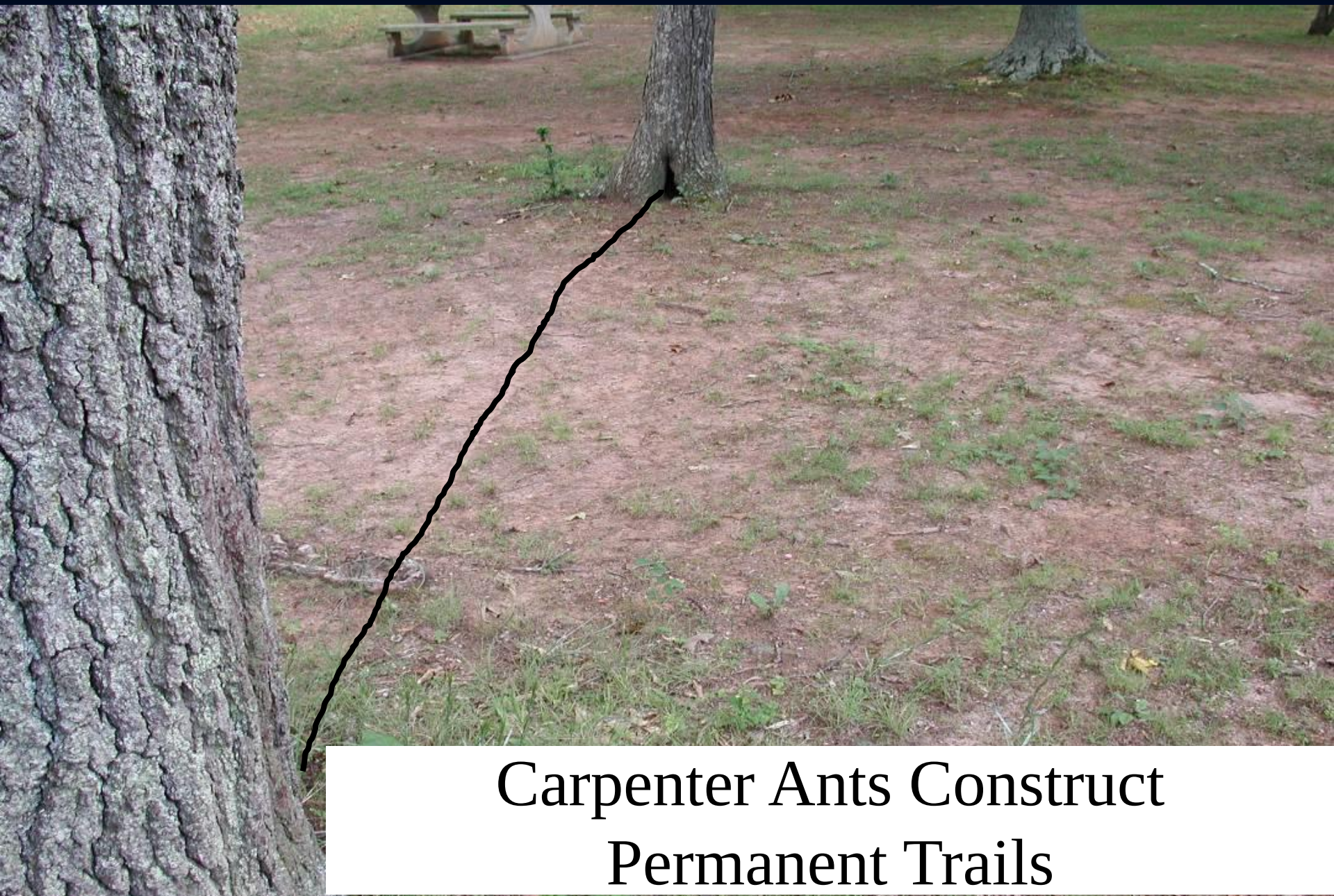




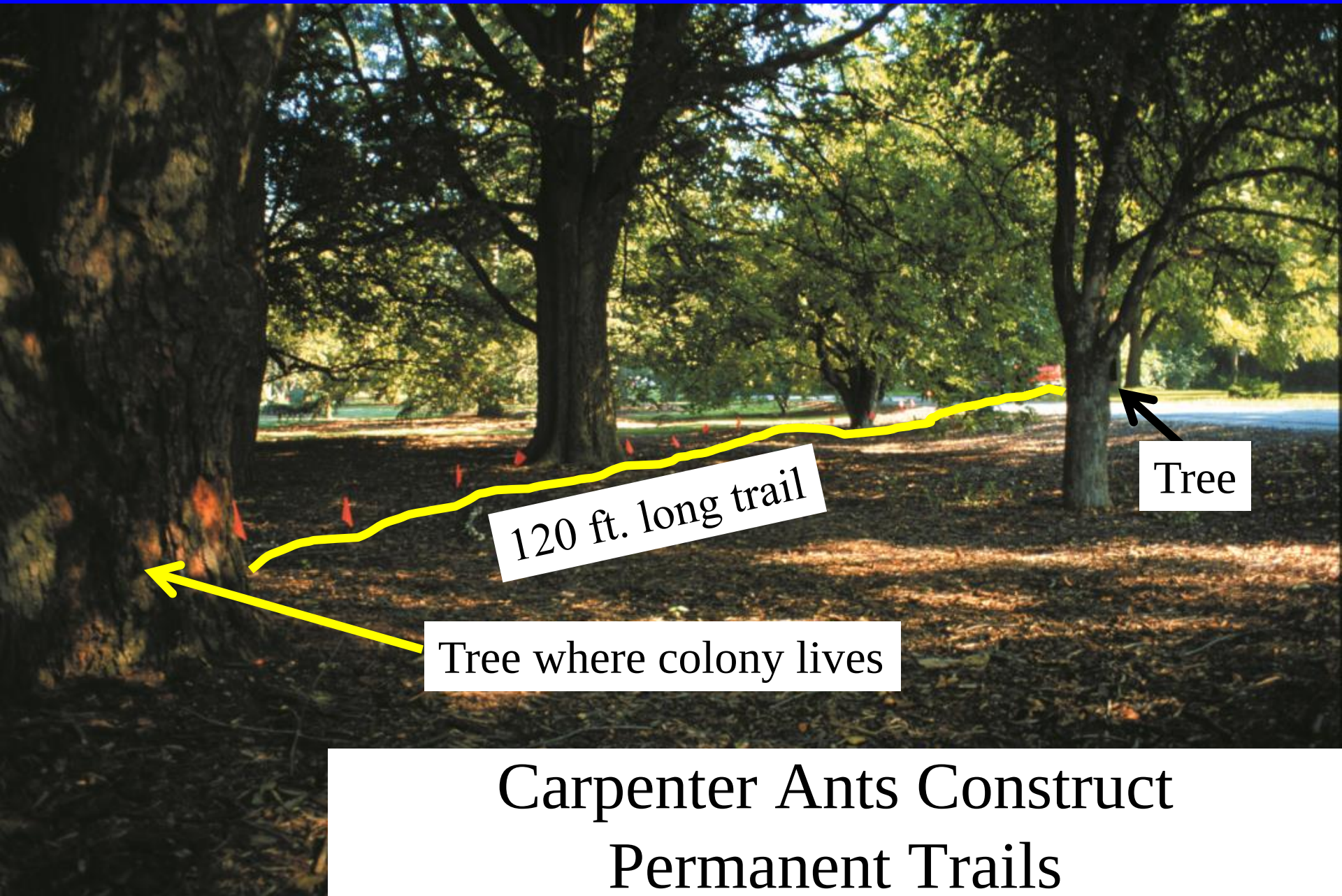
Outdoors, carpenter ants nest mainly in large, hardwood trees.



Carpenter Ants Construct
Permanent Trails



Carpenter Ants Construct
Permanent Trails



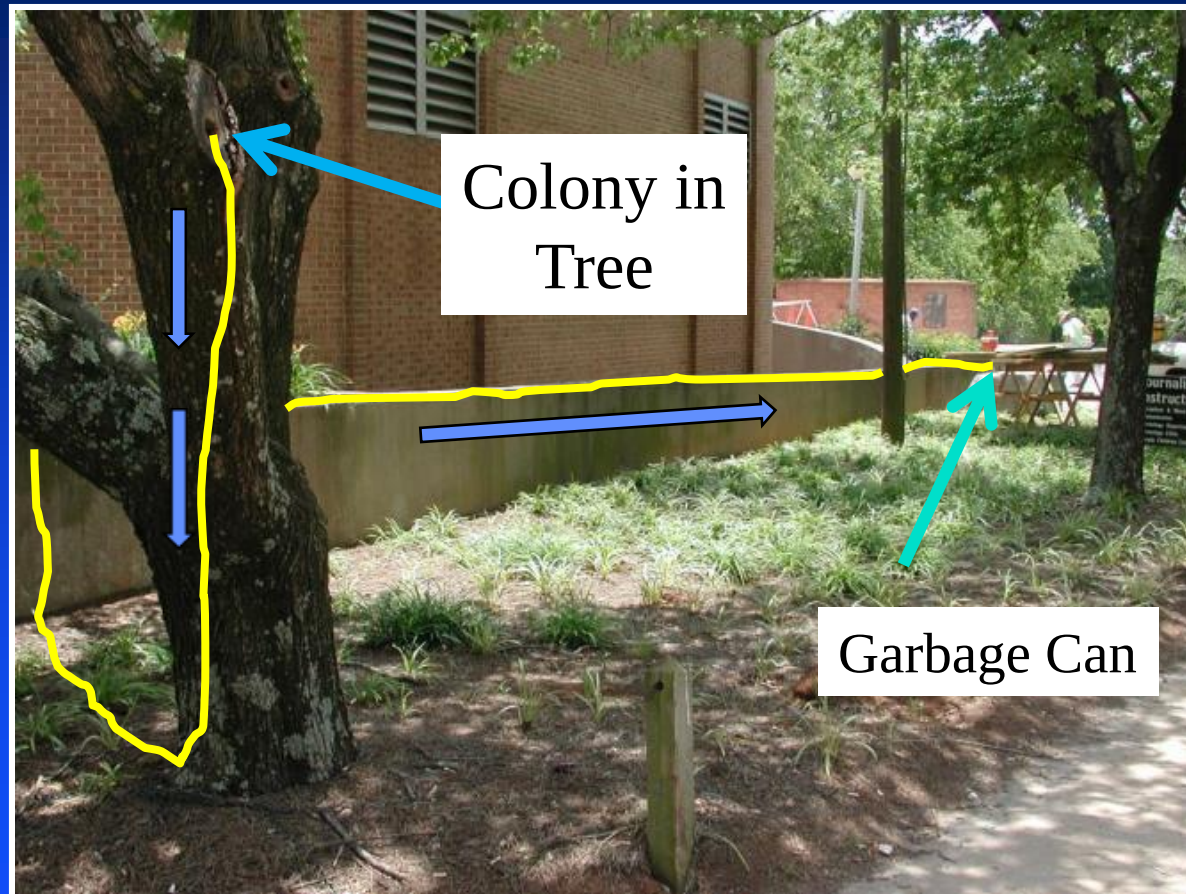
120 ft. long trail

Tree where colony lives

Tree

Carpenter Ants Construct
Permanent Trails

Carpenter Ants Follow Structural Guidelines



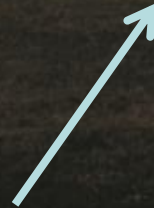
Ants in kitchen



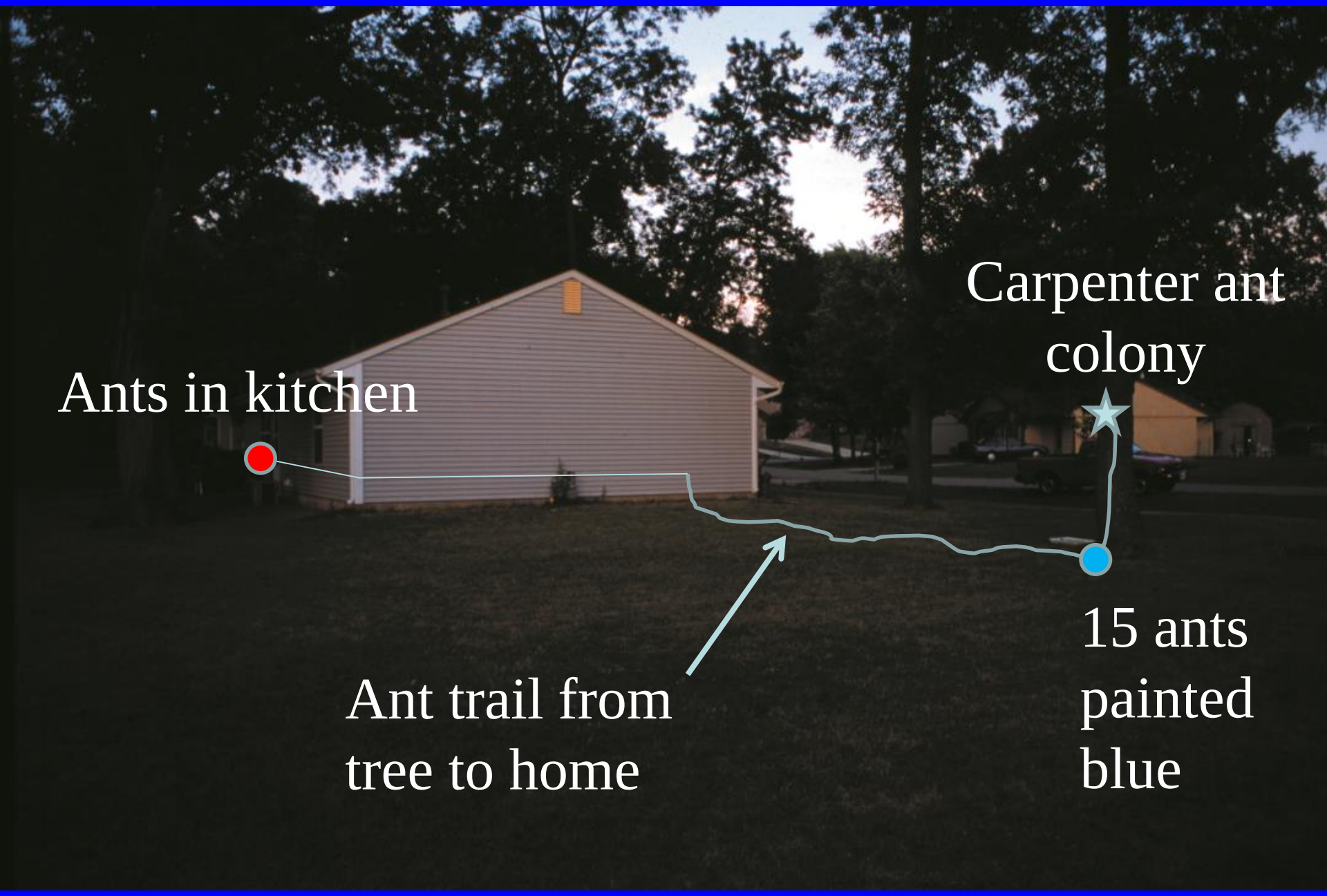
Carpenter ant colony



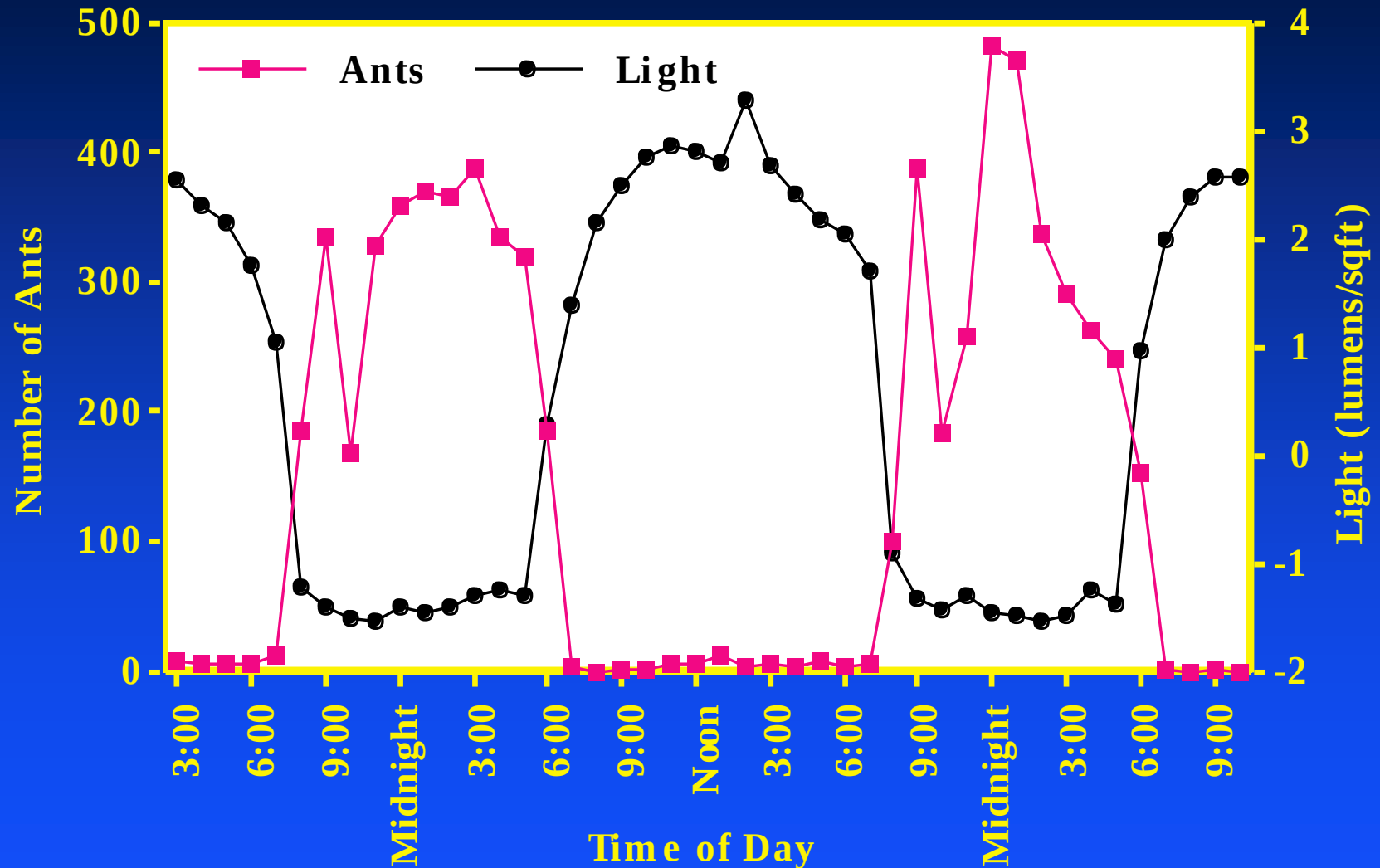
Ant trail from
tree to home



15 ants
painted
blue



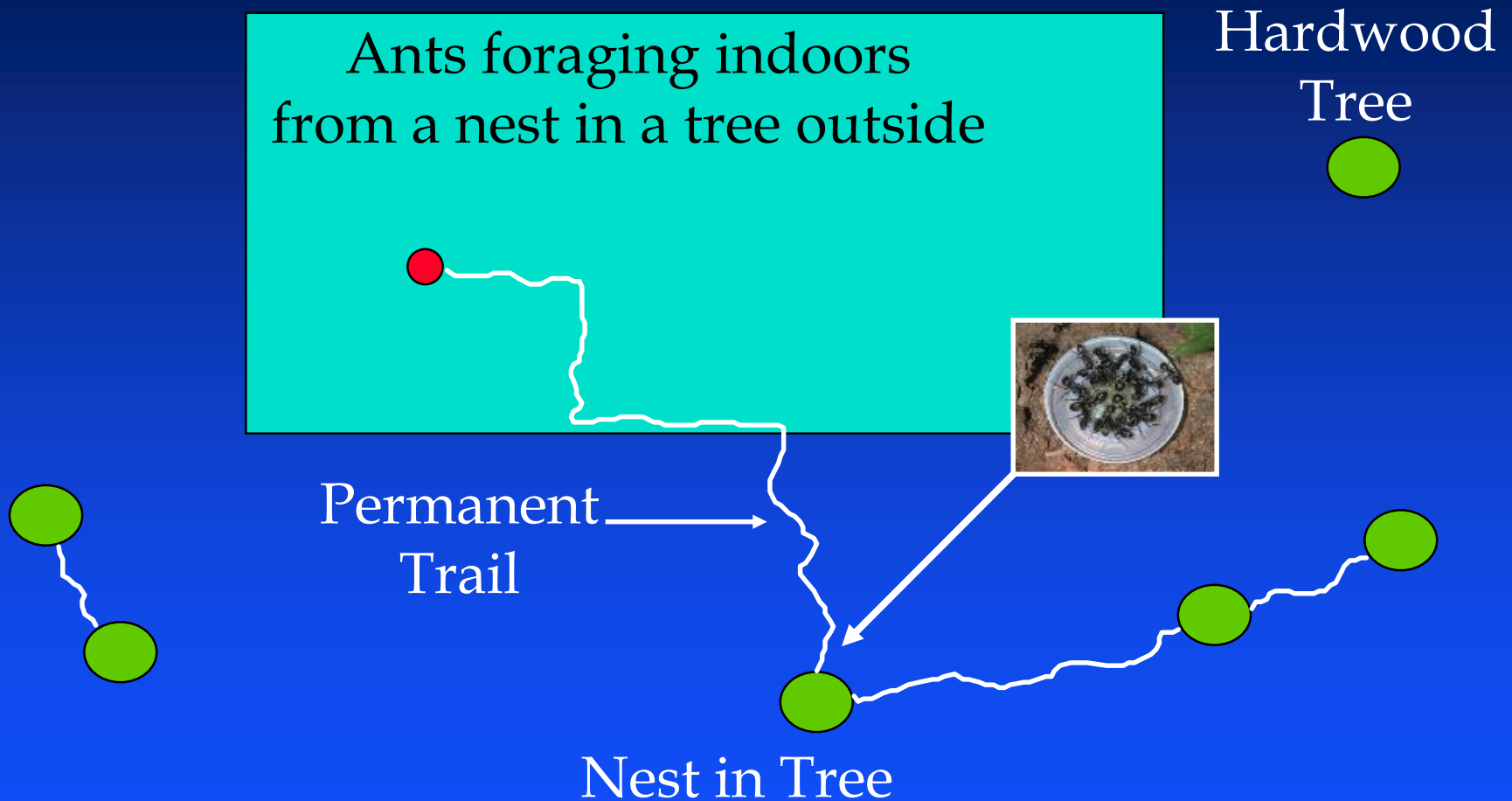
Carpenter Ants Forage Mainly at Night



Carpenter Ant Baiting



Deliver Granular & Gel Baits from Piles ON TRAILS or Where Ants are Seen



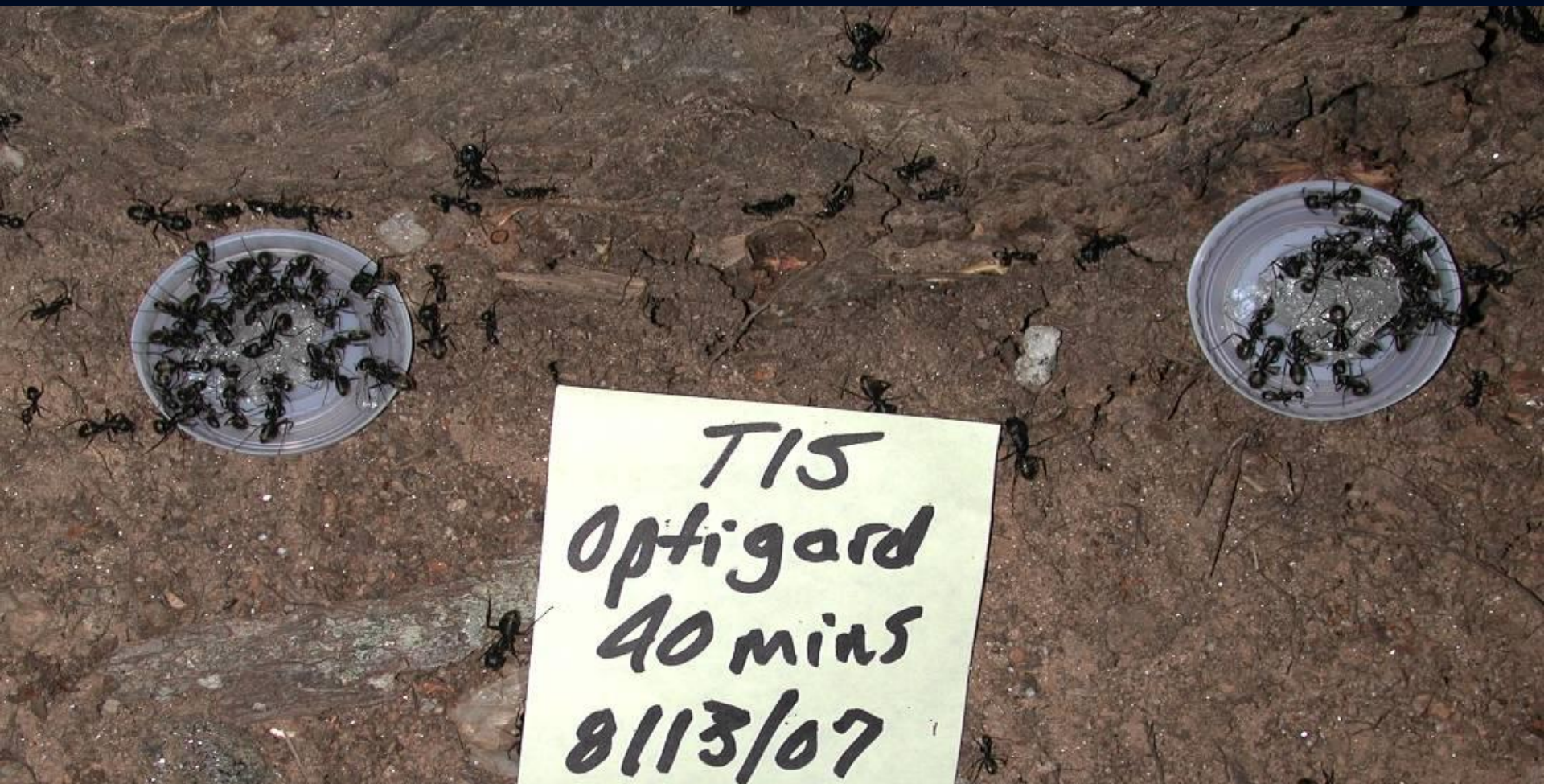
Carpenter Ant Baitings

Advion Ant Bait Gel (0.05% indoxacarb)





Advion Carpenter Ant Bait Gel
(0.05% indoxacarb)



Carpenter Ant Baitings
Optigard Ant Bait Gel (0.01% thiamethoxam)



Optigard Carpenter Ant Bait Gel
(0.01% thiamethoxam)



Carpenter Ant Baitings

Borate Bait #1



Carpenter Ant Baitings

Borate Bait #2



A photograph showing a large number of black ants on a dark, textured rock surface. Two small, light-colored plastic dishes are placed on the rock, each containing a pile of ants. The background includes some dry pine needles and a small, light-colored object. A white card with handwritten text is in the foreground.

Borate
Bait
Colony 1
Year 1

Carpenter Ant Baitings

MaxForce Carpenter
Ant Bait Gel
(0.001% fipronil)





MaxForce Carpenter Ant Bait Gel
(0.001% fipronil)



T25
D-MF Carp. Ant Gel
July 8, 2011
30-40 mins

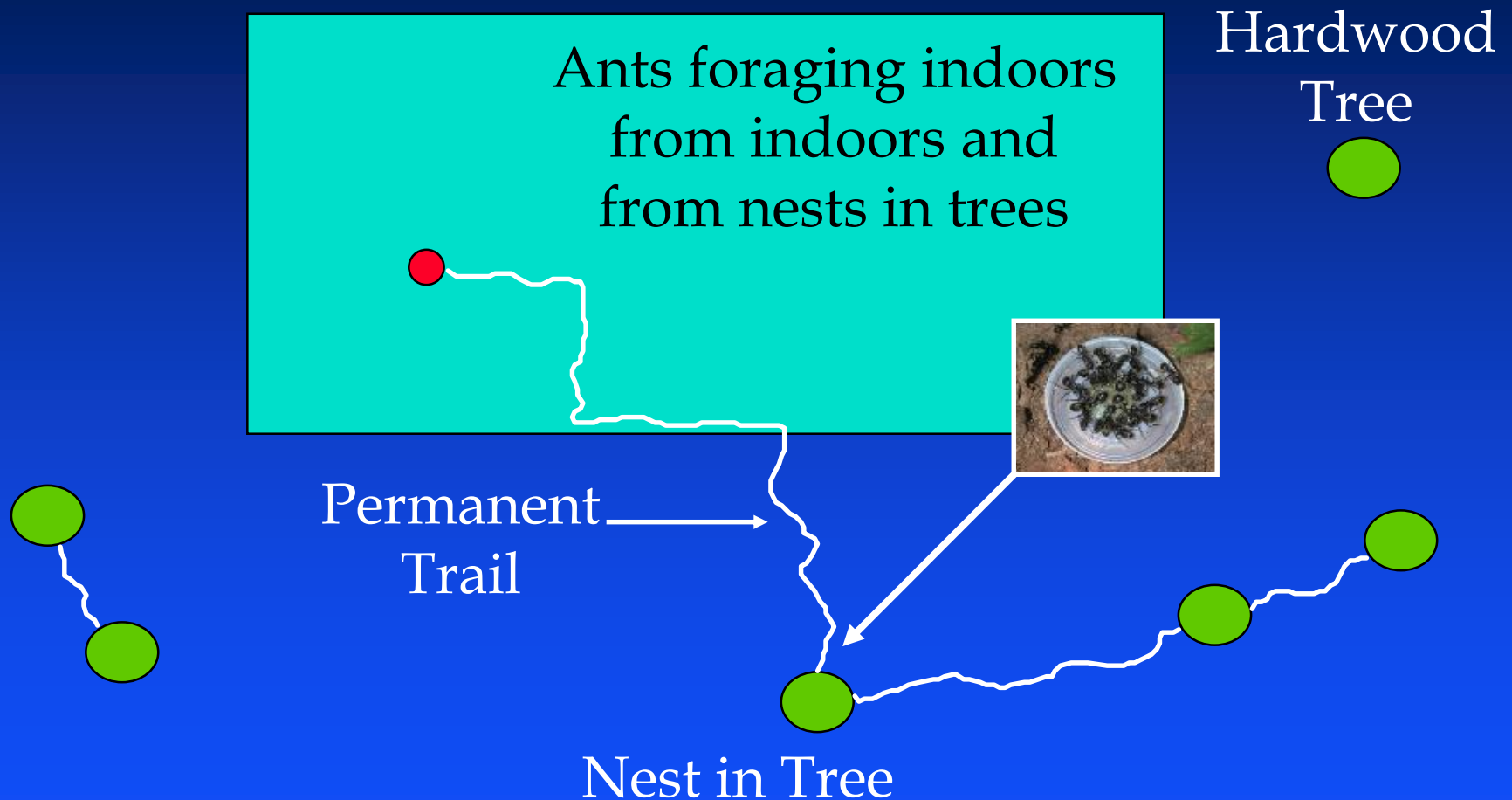
MaxForce gel placed here



MaxForce Gel: Colony Baited July 8, 2011
1,000+ Dead Carpenter Ants



Deliver Granular & Gel Baits from Piles ON TRAILS or Where Ants are Seen in Day



Given The Quality of Today's Carpenter Ant Baits...



Photo: David Cappaert at Bugwood.com

...Elimination is Possible.

dsuiter@uga.edu

770-233-6114

Contact me anytime.

Ants are not TERRIFYING!



Frederick P. Remelius

Director of Operations

Upper Merion Area School District, King of Prussia, PA

There are lots of ant products on the store shelves and in TV advertisements, but...



GET REAL -
You are in Charge!

Don't freak out.

Be Prepared
and be
Responsible.



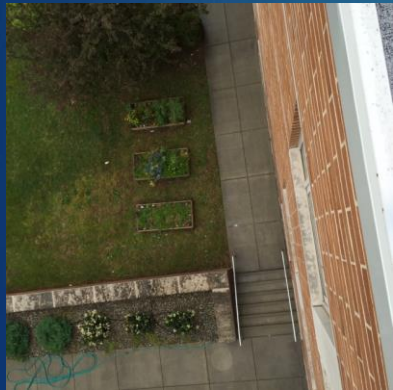
IF YOU FEED THEM,
THEY WILL COME.



Ants are REALLY, REALY good at finding food!



Ants found food
on the 3rd floor of
our Middle School



That's like you
climbing to the
top of this hotel
to find a hidden
pizza!



Four Seasons Hotel Miami
64 stories tall

6 STEPS FOR A PEST-FREE OFFICE

Office buildings provide pests with an ideal environment offering everything they need – food, water, shelter and comfortable temperatures. Luckily, there are proactive steps that you can take to reduce pest pressures and eliminate hot spots.

1 CLEAN UP SPILLS AND MESSSES

Regularly cleaning common areas like kitchens, lounges and conference rooms will remove crumbs that can attract pests from cockroaches to rodents.

2 CLEAR FOOD AND DRINKS ASAP

An old cup of coffee, leftover doughnuts and full trash cans are all open invitations to ants, flies and other bugs.

3 COVER AND SEAL GARBAGE AND RECYCLING BINS

Pests flock to dumpsters. Make sure trash is stored at least 15-20 feet from your building and clean the surrounding area.

4 SEAL HOLES, CRACKS AND GAPS

Inspect the building exterior for small openings. Mice can fit through a hole approximately the size of a dime and rats, the size of a quarter.

5 CUT BACK PLANTS NEAR BUILDING ENTRANCES

At least 2 feet is a good rule of thumb. Trees and shrubs are a natural habitat for pests; so those that come too close to your building offer easy access.

6 CONTACT YOUR PEST CONTROL PROVIDER

Encourage tenants to report pest sightings immediately and involve your pest management professional as soon as possible.



IF YOU FEED THEM,
THEY WILL COME.



An EXTREMELY rare example of an ant infestation

- ▶ The problem:
 - ▶ Is there any way we can get an exterminator at the boathouse? There are ants inside everywhere and all over the outside of the building.
- ▶ Our response:
 - ▶ Inspect
 - ▶ ID the ant
 - ▶ Determine control options
 - ▶ Post notice
 - ▶ Apply appropriate pesticide



Typical ant problem at UMASD

- ▶ The problem:
 - ▶ :We have ants in the stock room in the cafe area."
- ▶ Our response:
 - ▶ Inspect
 - ▶ ID the ant
 - ▶ Determine control options
 - ▶ Post notice
 - ▶ Apply appropriate pesticide



IF YOU FEED THEM,
THEY WILL COME



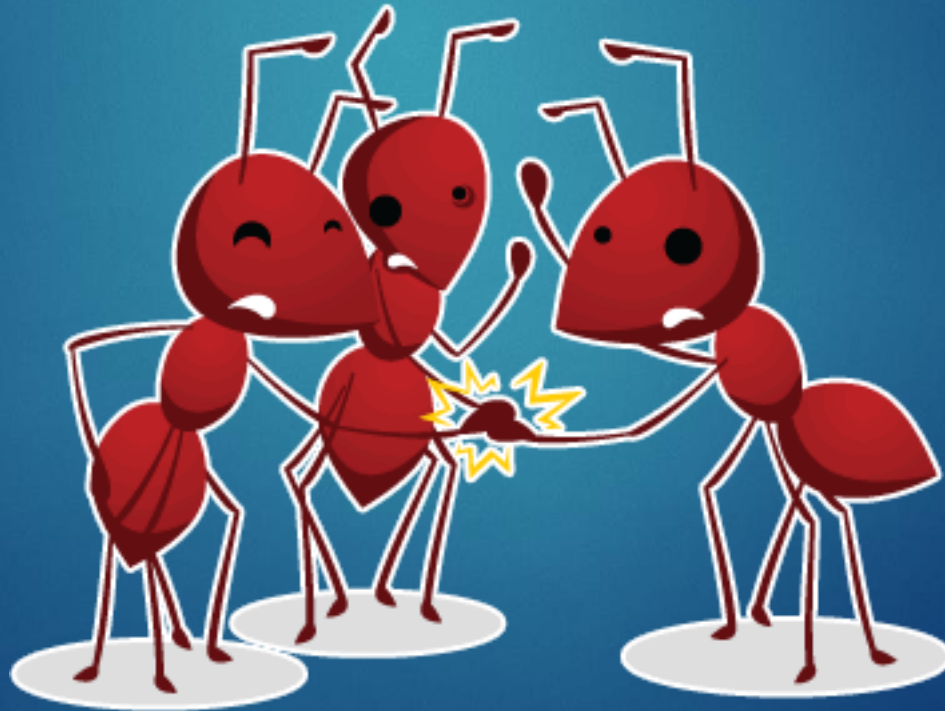
How do ants find food?

When **ants** leave the nest in search of **food**, they walk randomly, leaving trails of home-finding pheromone as they go.

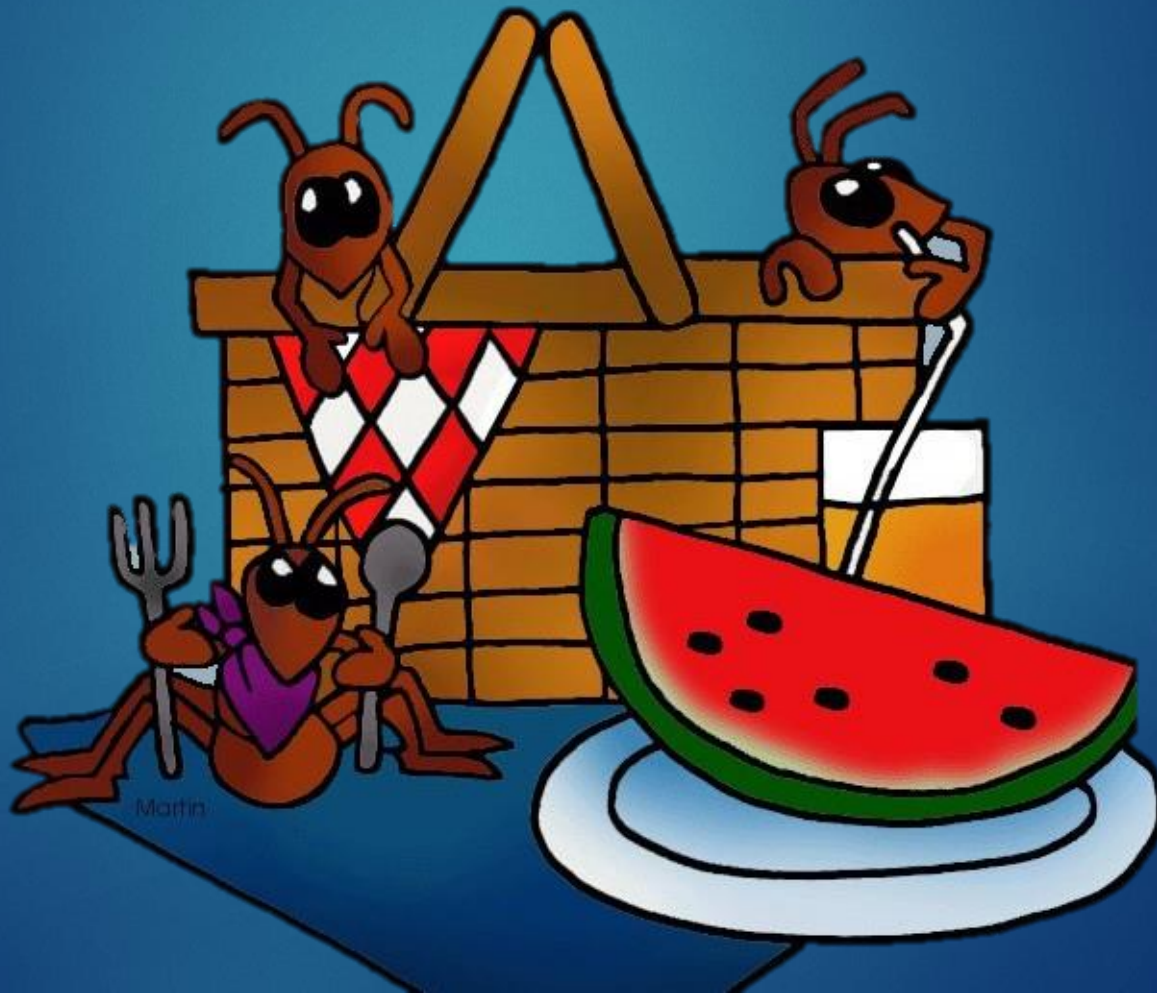
When an ant finds **food**, it picks up a piece and follows its home-finding trail back to the nest, leaving a trail of **food**-finding pheromone as it goes.

Think like an ant!!

So, how do you
outsmart an ANT?
It's so easy!



DON'T FEED THEM!



CLEAN THEM!



Use a general purpose cleaner:

- It cleans (kills) them
- It removes the trail that was laid down to the food
- It eliminates their food.

What did we learn about ants:

- ▶ If you feed them, they will come.
- ▶ You are smarter than an ant.
- ▶ Don't feed them – reinforce with your school district's employees.
- ▶ Clean them – reinforce this with your janitors.
- ▶ Relax



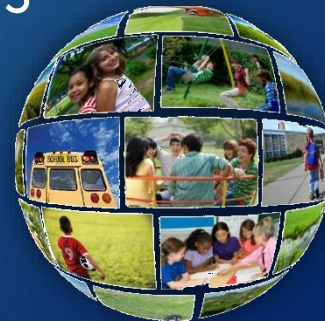
Upcoming School IPM Webinar



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ANTS - #1 PEST IN SCHOOLS



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Questions?



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