Insects that Affect Pines



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Outline

Pine pest insects

- Nantucket pine tip moth
- Southern pine beetle
- Ips engraver beetles
- Black turpentine beetle
- Pine sawyer
- Ambrosia beetles

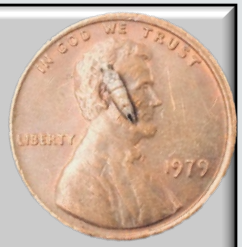
Nantucket Pine Tip Moth (NPTM)
Rhyacionia frustrana (Comstock)

- Native regeneration pest
- Preferred hosts
  - Loblolly
  - Shortleaf
  - Virginia

- Susceptible pines
  - First five years after planting
  - Less than 3 meters tall

Nantucket Pine Tip Moth (NPTM)
Rhyacionia frustrana (Comstock)

- Order – Lepidoptera
- Has pupal phase
- 2-5 generations/yr
- Generations timed with pine growth flushes
- Later larval instars feed inside the pine shoots



Life Cycle

Adult Stage

Mark Dreiling, Bugwood.org

Egg Stage

U.S Department of Agriculture and Forest Service

Larval Stage

Cassandra Waldrop , University of Georgia

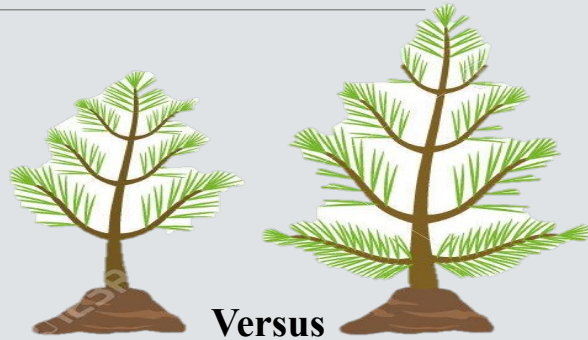
Pupal Stage

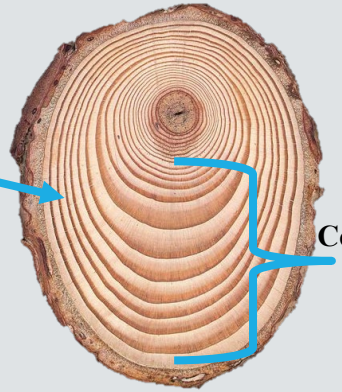
Elizabeth McCarty , University of Georgia

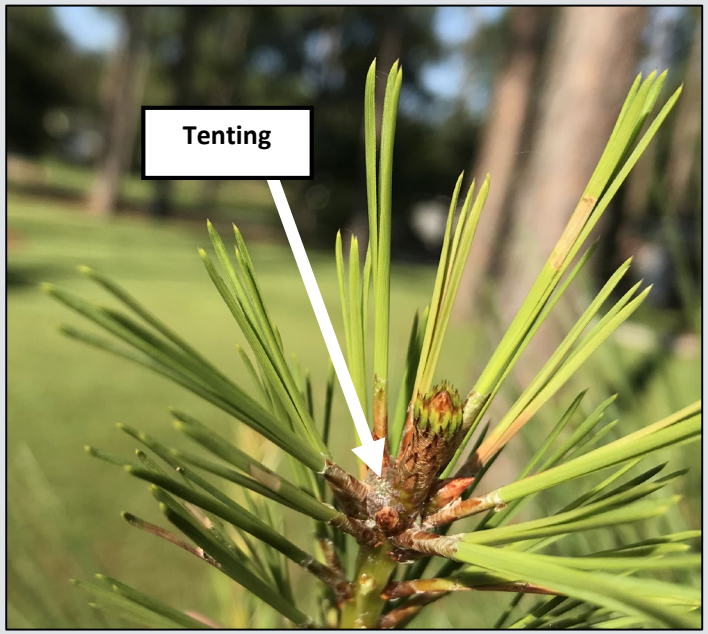
Occurs 2 – 5 times a year

Tree Damage

- Shoot die-back
- Reduced growth
- Tree defects
- Forking
- Mortality (rare)






Tenting


Feeding damage


Branch tip dying


Branch
tips dying


Loss of a single leader
and straight stem


Start with small straight tree


Straight stem


Bushy appearance from NPTM damage

Management Tactics

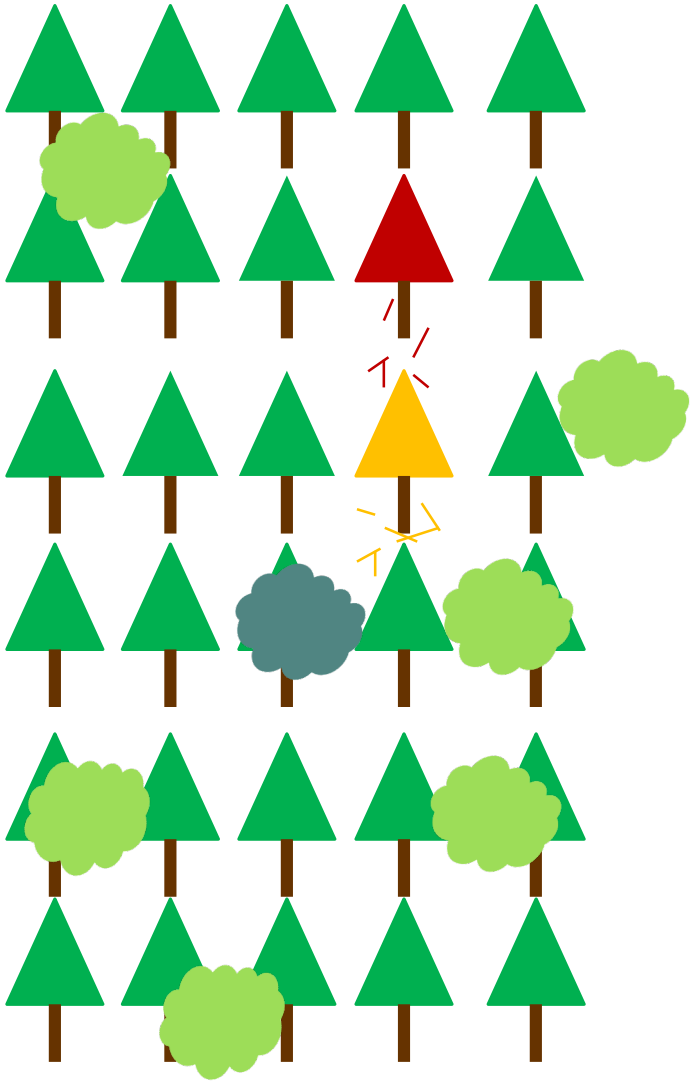
- Contact insecticides – young larvae
  → not often used
- Systemic insecticides – two year efficacy??
- Plant less susceptible species
- Do nothing – damage threshold issues

Systemic Insecticides

- Systemic insecticides – two year efficacy?
  - PTM insecticide (fipronil)
  - CoreTect (imidacloprid)
- PTM injected into containerized seedlings soil plugs
- A new insecticide on the horizon

Do Nothing

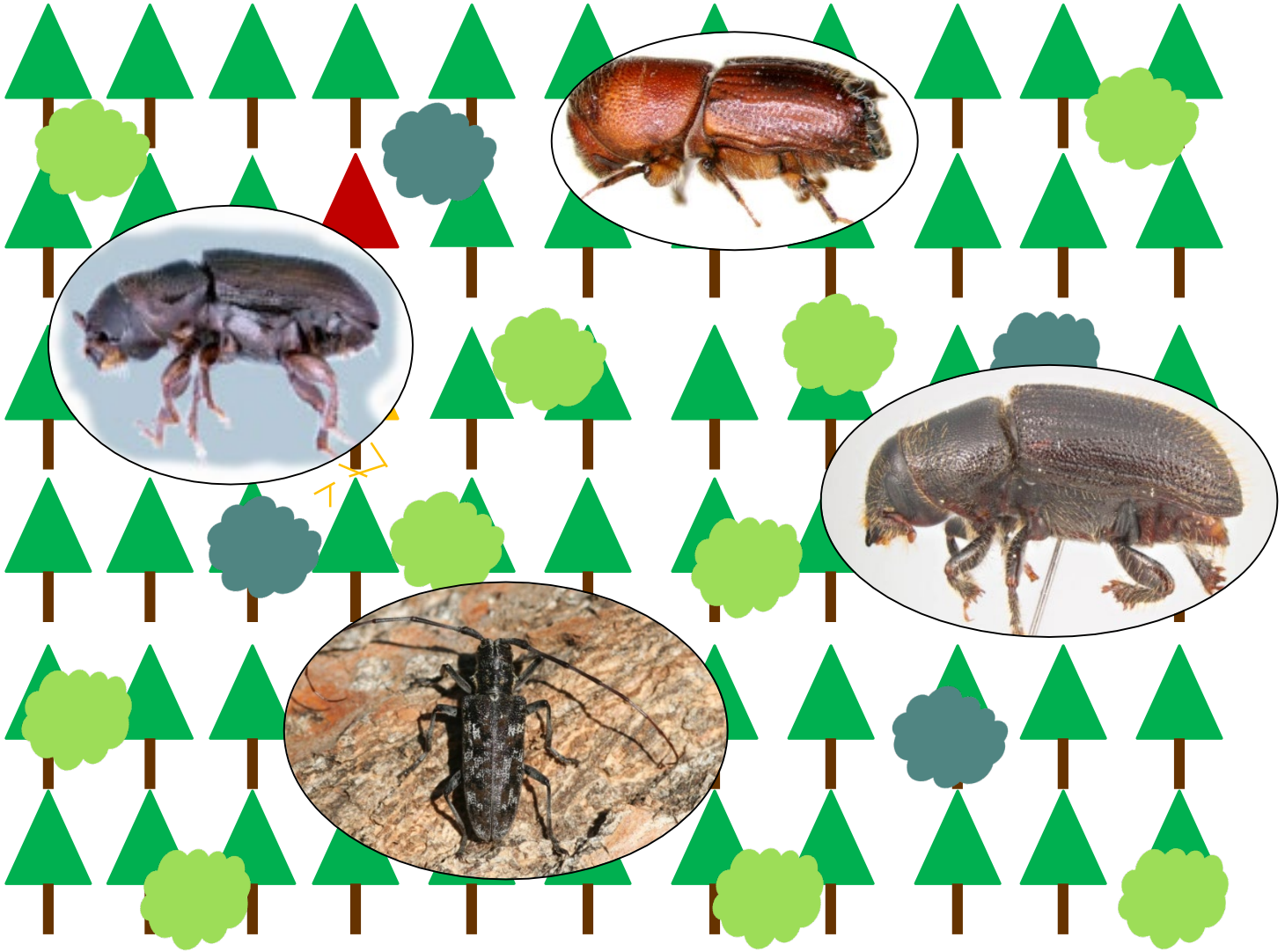
- Assumption/myth that trees grow out of NPTM damage
- Literature is mixed on damage and associated yield losses → remember slinky analogy
- Hard to know when it makes financial sense to use insecticides
- Consider the difference in rotation time between a row crop and pine trees



Sometimes trees die.

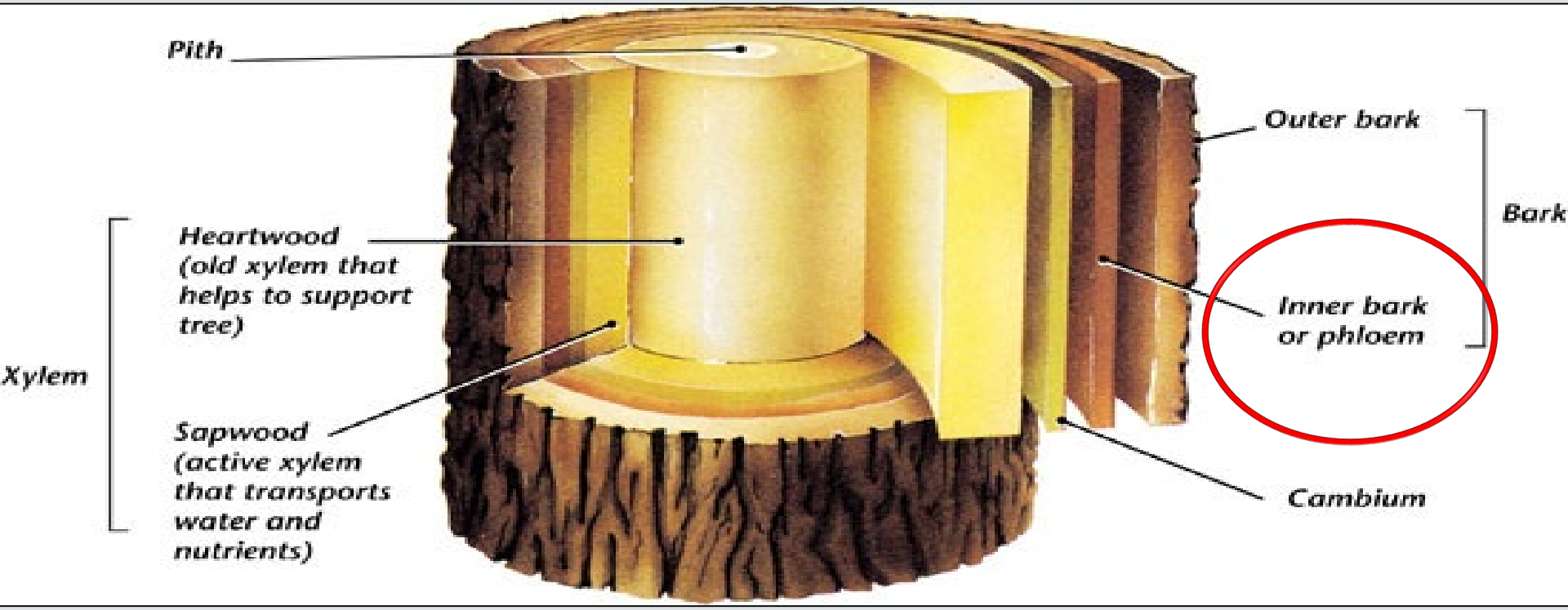
What happens when a tree dies?

- Natural breakdown
  - Insects
  - Fungi
- Returns carbon and nutrients to the environment



Diverse Insect Community as Pines Decline

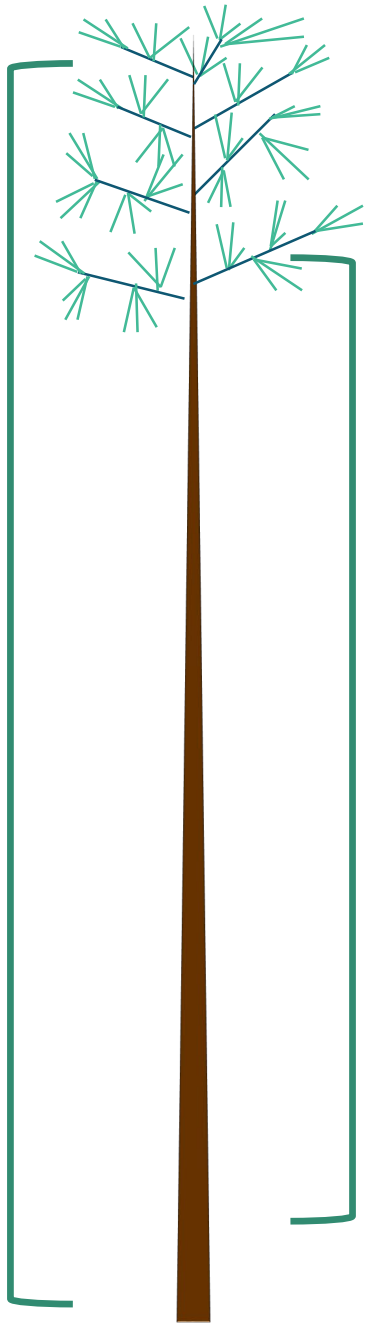
Who are the players?



Tree Structure

Where are bark beetles in the tree?

Different types of bark beetles tend to attack different locations on the tree



Engraver Beetles

Southern Pine Beetle

Black Turpentine Beetle

Southern pine beetles

Dendroctonus frontalis

- Native pest
- Low level attacks to stressed trees
- Epidemics – healthy trees attacked
- Spots expand up to 50 feet a day
- Can infest thousands of acres
- 6-7 generations a year

David T. Almquist, University of Florida

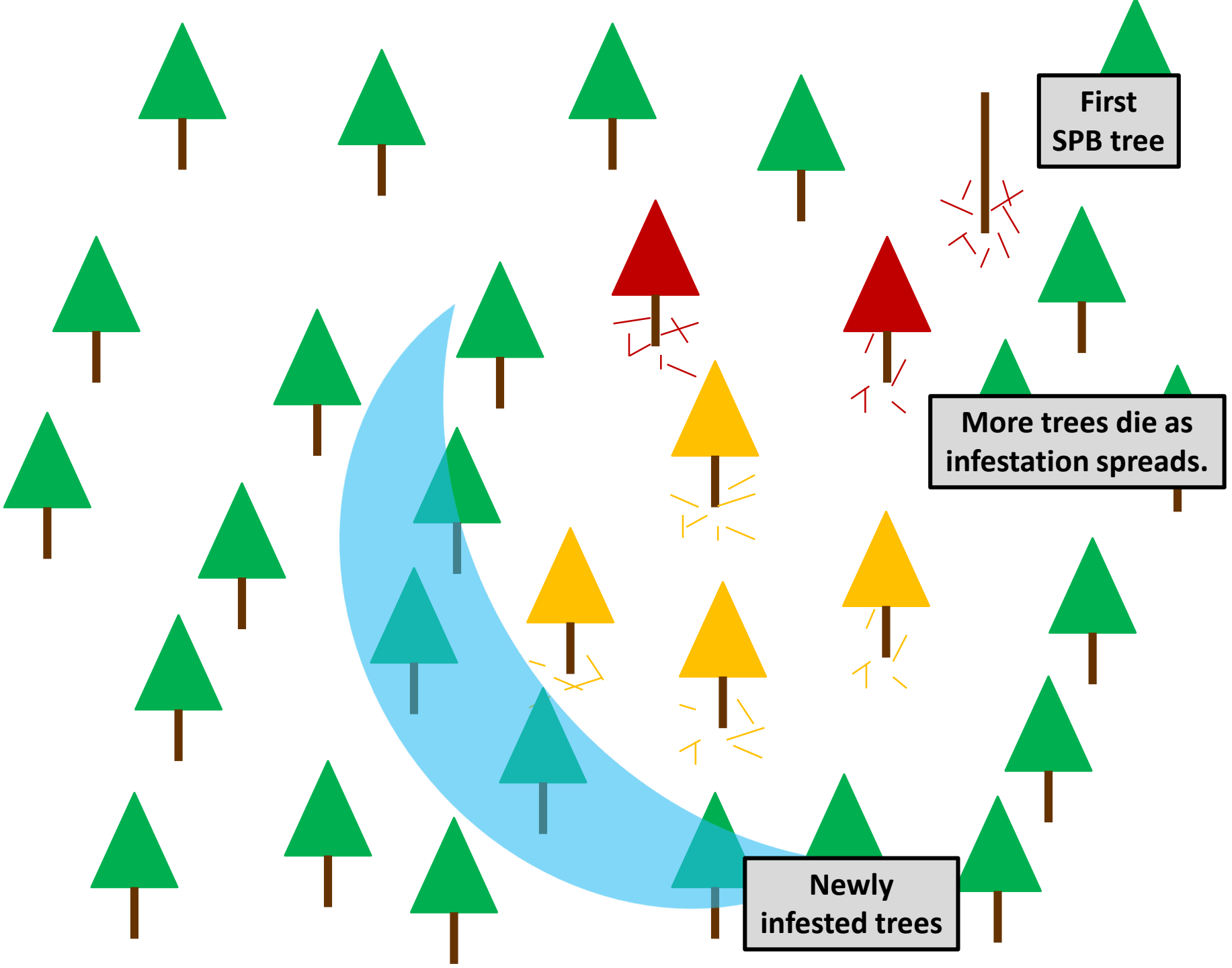
Green needles on the ground

SPB pitch tubes

SPB caught in pitch

SPB galleries

SPB pitch tubes
in bark crevices


First SPB tree
More trees die as infestation spreads.
Newly infested trees

Larger SPB spots with multiple heads can appear more roundish

Engraver Beetles

Ips avulsus, grandicolis, calligraphus

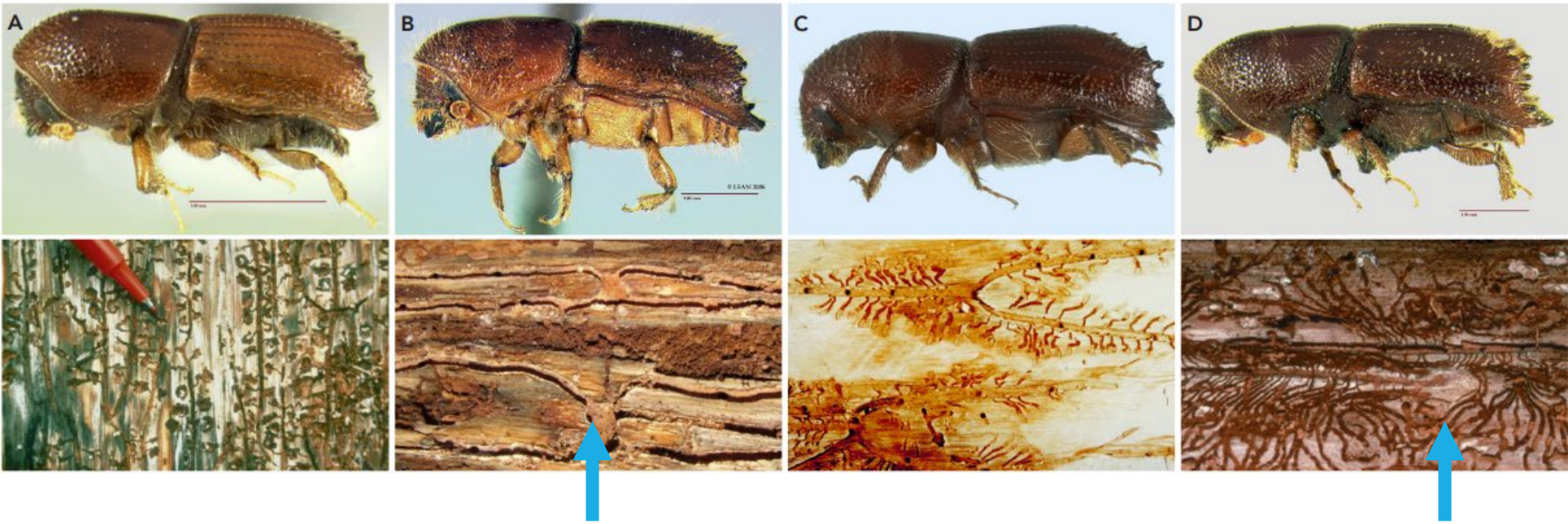
- Isolated occurrence (usually)
- Colonize stressed trees, branches, slash
- Spiky hind end
- Up to 10 generations per year
- Secondary

Small southern pine engraver
Ips avulsus

Eastern five-spined
Ips grandicollis

Pine engraver
Ips pini

Six-spined *Ips*
Ips calligraphus



Ips Bark Beetles in the Southeastern U.S.
Southern Regional Extension Forestry
D. Coyle, B. Self, J. Floyd, and J. Riggins
http://www.sref.info/resources/publications/ips-bark-beetles-in-the-southeastern-u.s

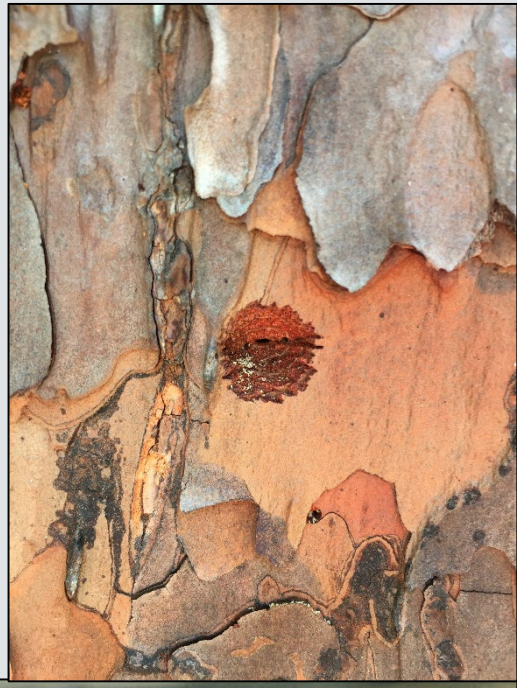
Engraver (*Ips*) galleries in the inner bark

Engraver (*Ips*) exit/entrance holes on the bark plates

Roundheaded Wood Borers

Monochamus spp. (Cerambycidae)

- Longhorned beetles - pine sawyers
- 1-3 yr life cycle
- Tunnel into phloem, heartwood, and sapwood
- Attack weakened/dying trees
- Secondary pest




A picture of park peeled off a dying tree. There are galleries from three different beetles.
Pine sawyers
Monochamus spp.
Six-spined *Ips*
Ips calligraphus
Eastern 5-spined *Ips*
Ips grandicollis

Pine sawyers
Monochamus spp.

Six-spined *Ips*
Ips calligraphus

Eastern 5-spined *Ips*
Ips grandicollis

engraver beetle feeding in gallery

SPB
S-shaped galleries

engraver beetle
branching galleries

SPB
pitch tubes
in bark crevices

engraver beetle
entrance/exit holes
on bark plates

Black turpentine beetles

Dendroctonus tenebrans

- Lower 12 feet of the trunk
- Scattered/patchy pine mortality
- Not as likely to kill pines as other bark beetles
- Accumulated attacks over numerous years can kill trees
- 3+ generations per year
- Feed on injured/stressed trees

BTB feeding in a cluster – not branching out much

BTB pitch tubes lower on the trunk

SPB
pitch tubes
with sap

black turpentine beetle
large pitch tubes
lower on the trunk

"Sawdust" from entrance hole

Galleries deep into heartwood

Wayne Brewer, Auburn University, Bugwood.org

Ambrosia beetles

***Xyleborus* spp., *Xylosandrus* sp., *Platypus* sp.**

- Small (approx. 2mm)
- Usually attack only dead/dying trees
- Part of the normal decomposition process
- Fungus-feeding beetles
- Dig tunnels in trees to grow fungi
- Fungi is their main food source
- Beetle brings their fungi to the tree
- Cannot survive on plant tissues alone

Engraver (*Ips*) exit/entrance holes on the bark plates

ambrosia beetles entrance holes with “sawdust”

Deodar Weevil

Pissodes nemorensis

- Snout weevils (Curculionidae)
- 1 generation each year
- Active fall to early spring
- New adults emerge in spring
- Attack weakened/dying trees
- Secondary

Bark sloughing off

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Chip cocoons

Management Tactics

- Systemic insecticide – not recommended most of the time
- Contact insecticide – not recommended most of the time
- Silvicultural methods
  - Cut-and-leave
  - Cut-and-remove
  - Pile-and-burn

  } depends on site conditions/needs

  - Cut-and-spray (insecticide) → not recommended

Systemic Insecticides

- Not recommended in most situations
- Only economical for high value trees
- Can be used for *Ips* and BTB
- Recommended only as a preventative
- Not appropriate for SPB

Contact insecticide

contact insecticide

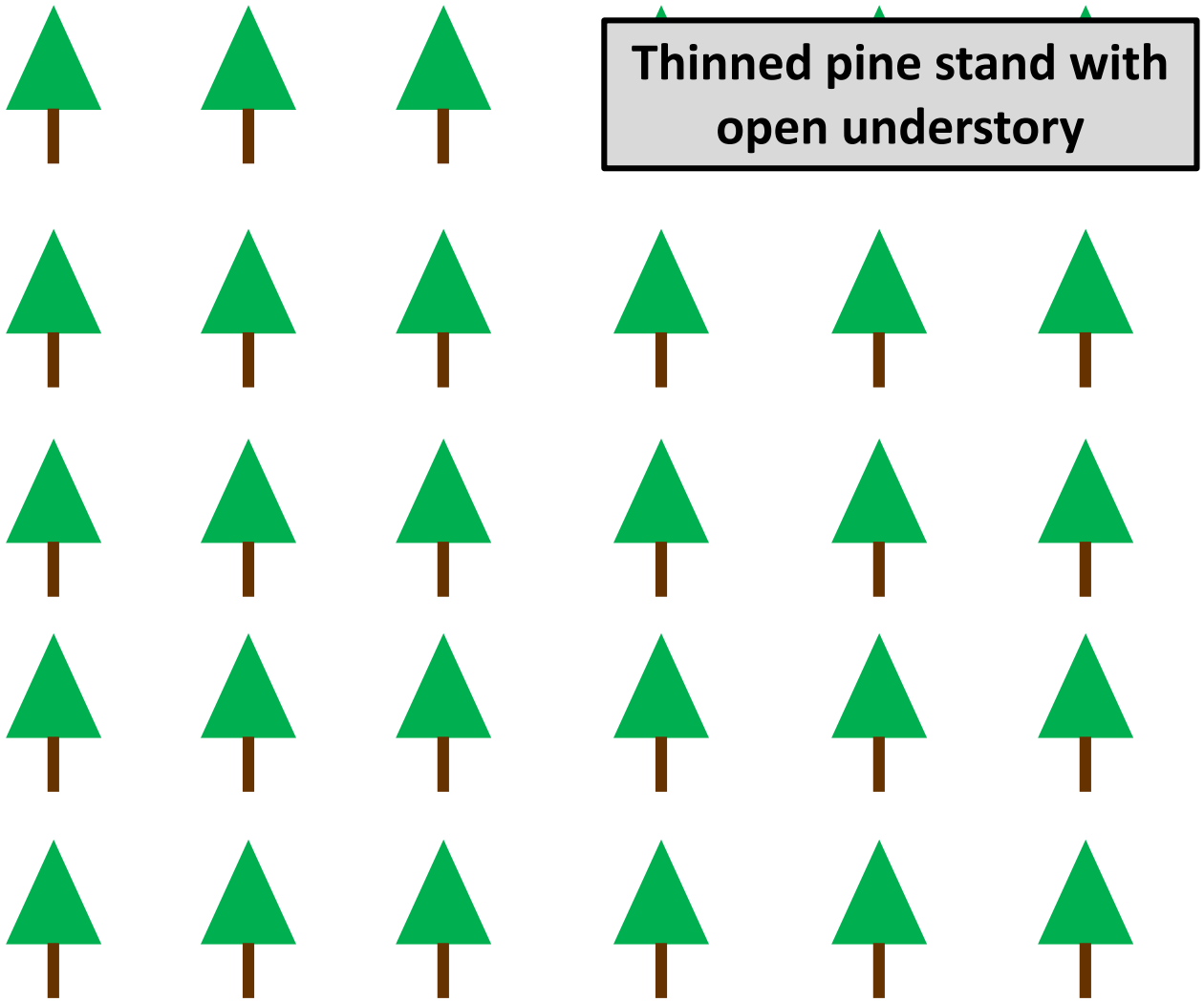
- Numerous product applications each season
- High pressure hoses for engraver beetles
- Chlorpyrifos, bifenthrin

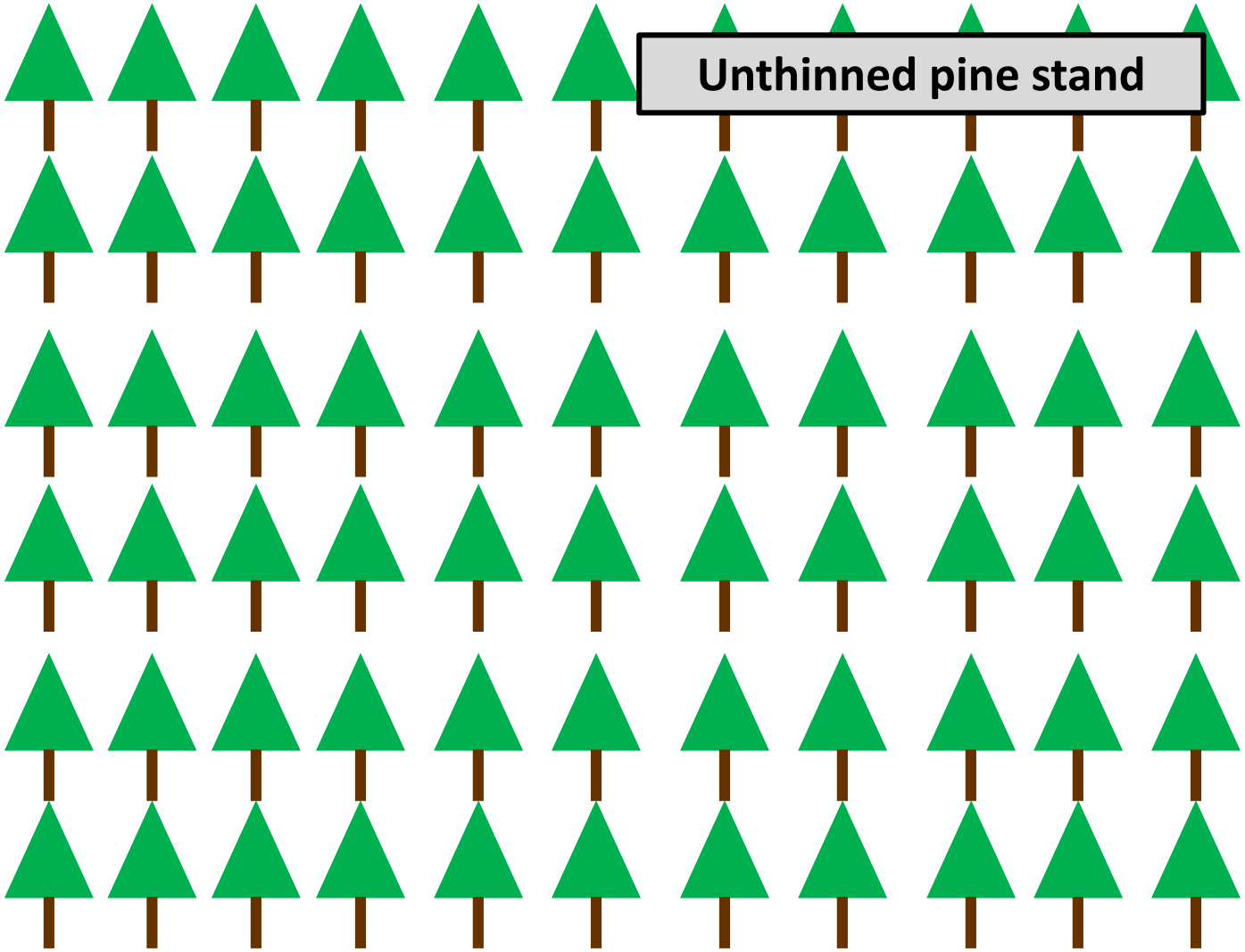
Contact insecticide

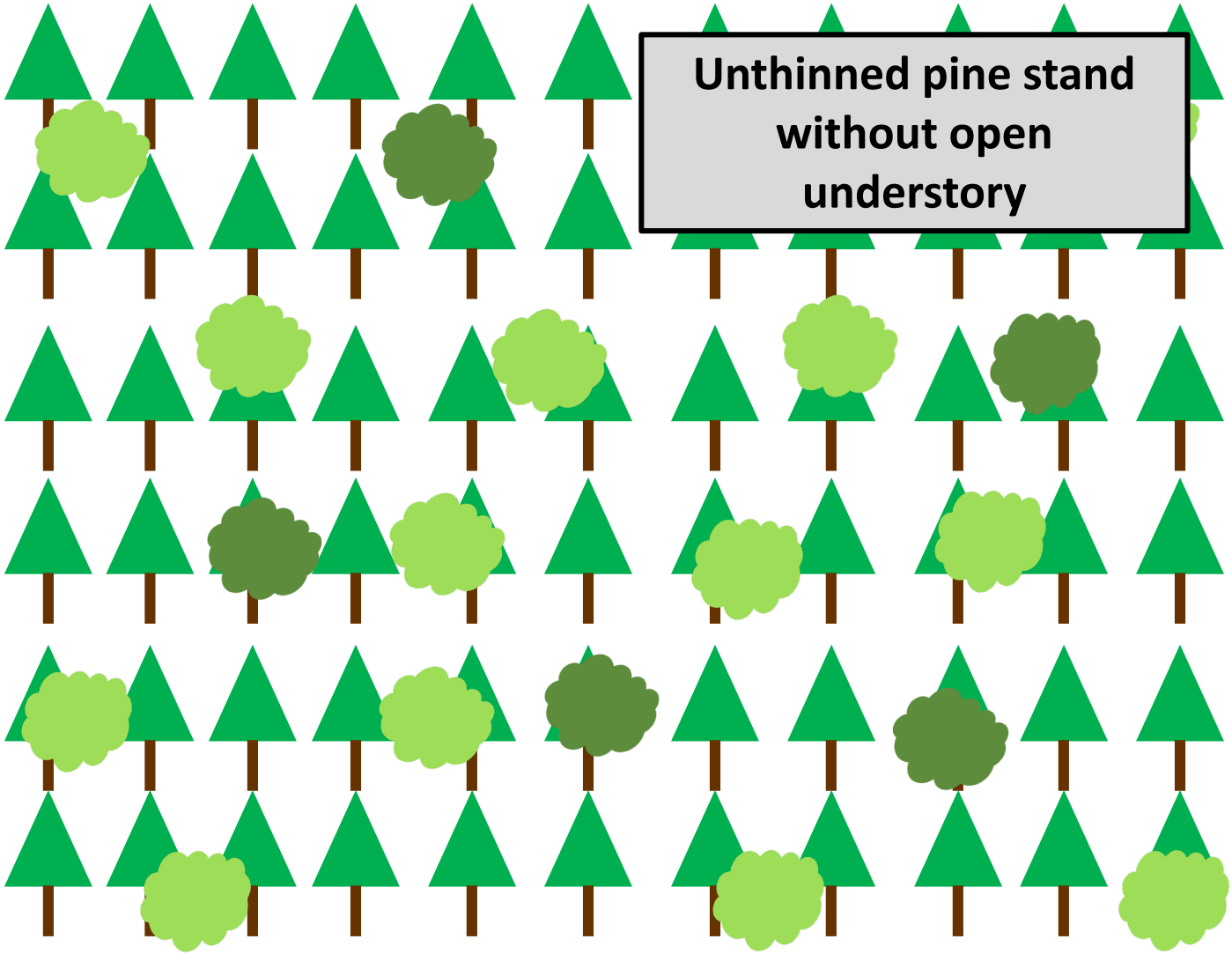
contact insecticide

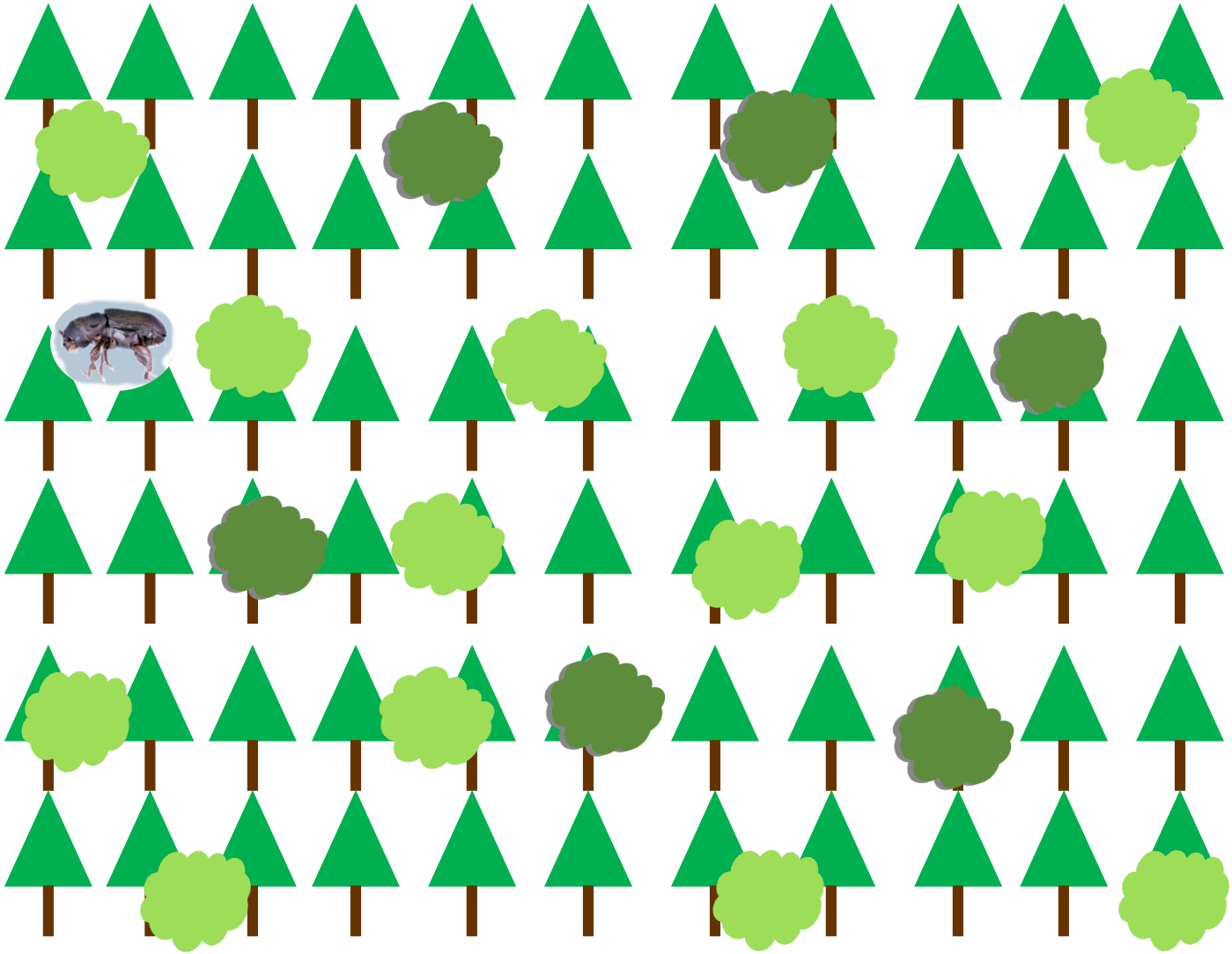
Possibility of overspray in residential areas

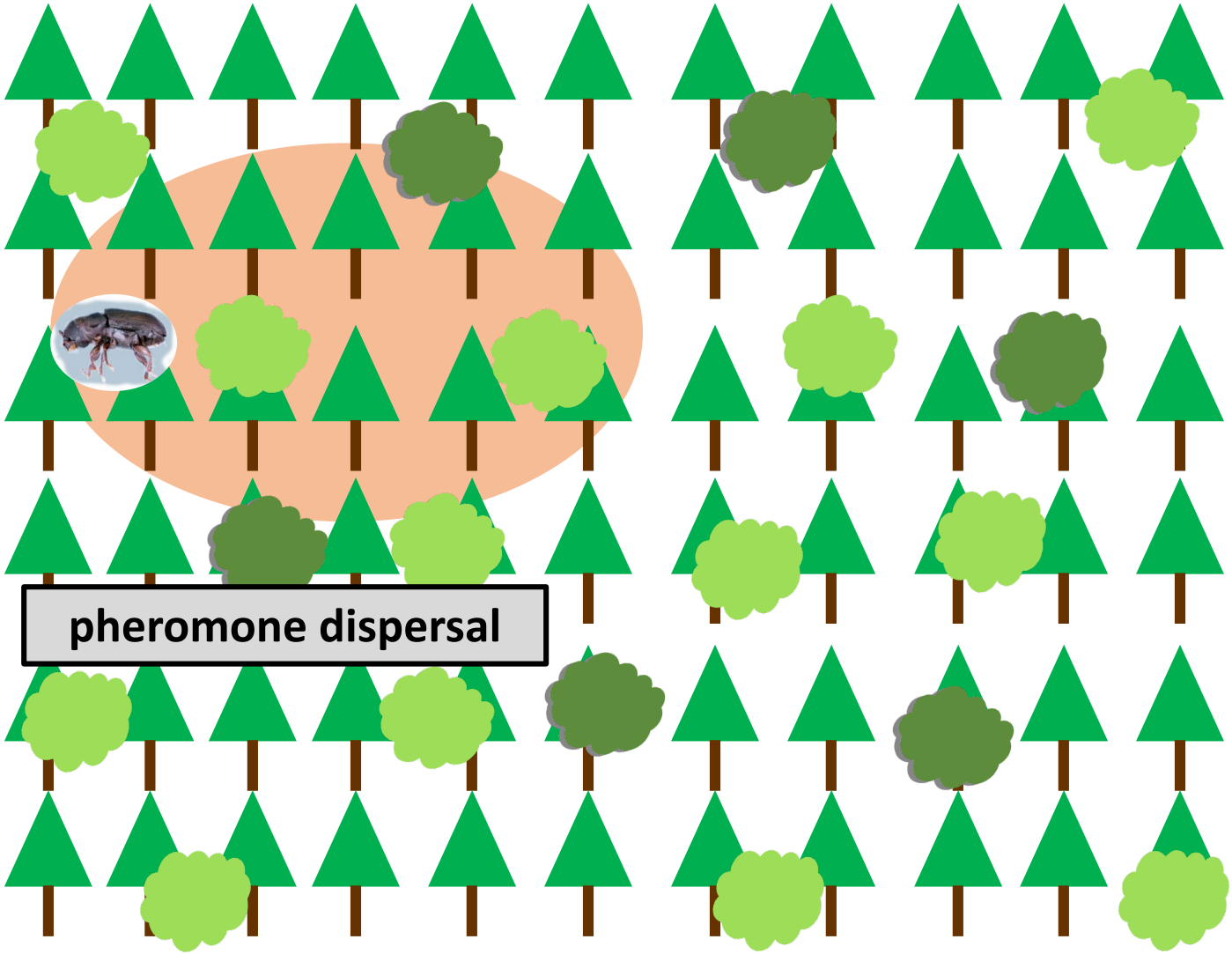
Silvicultural methods

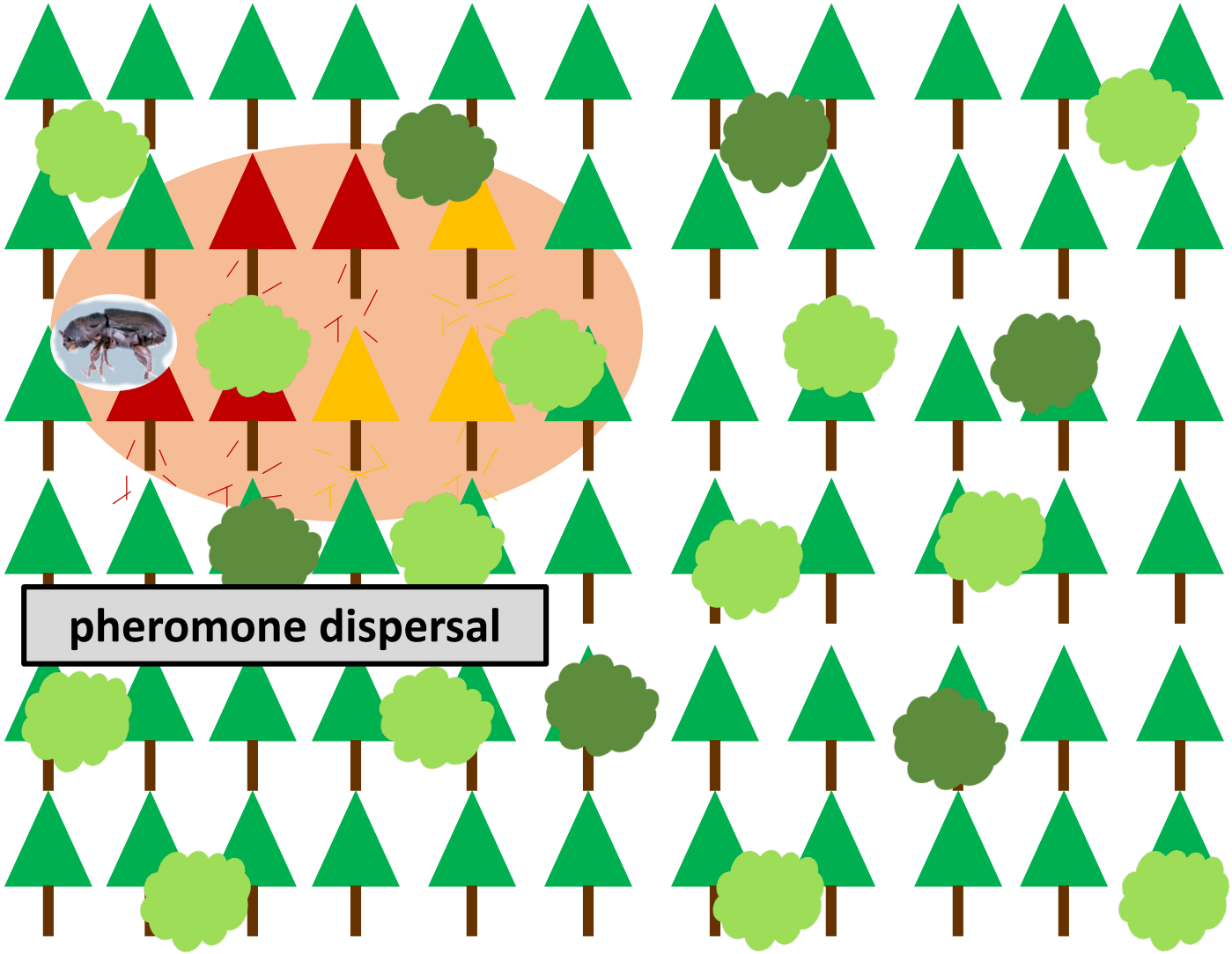


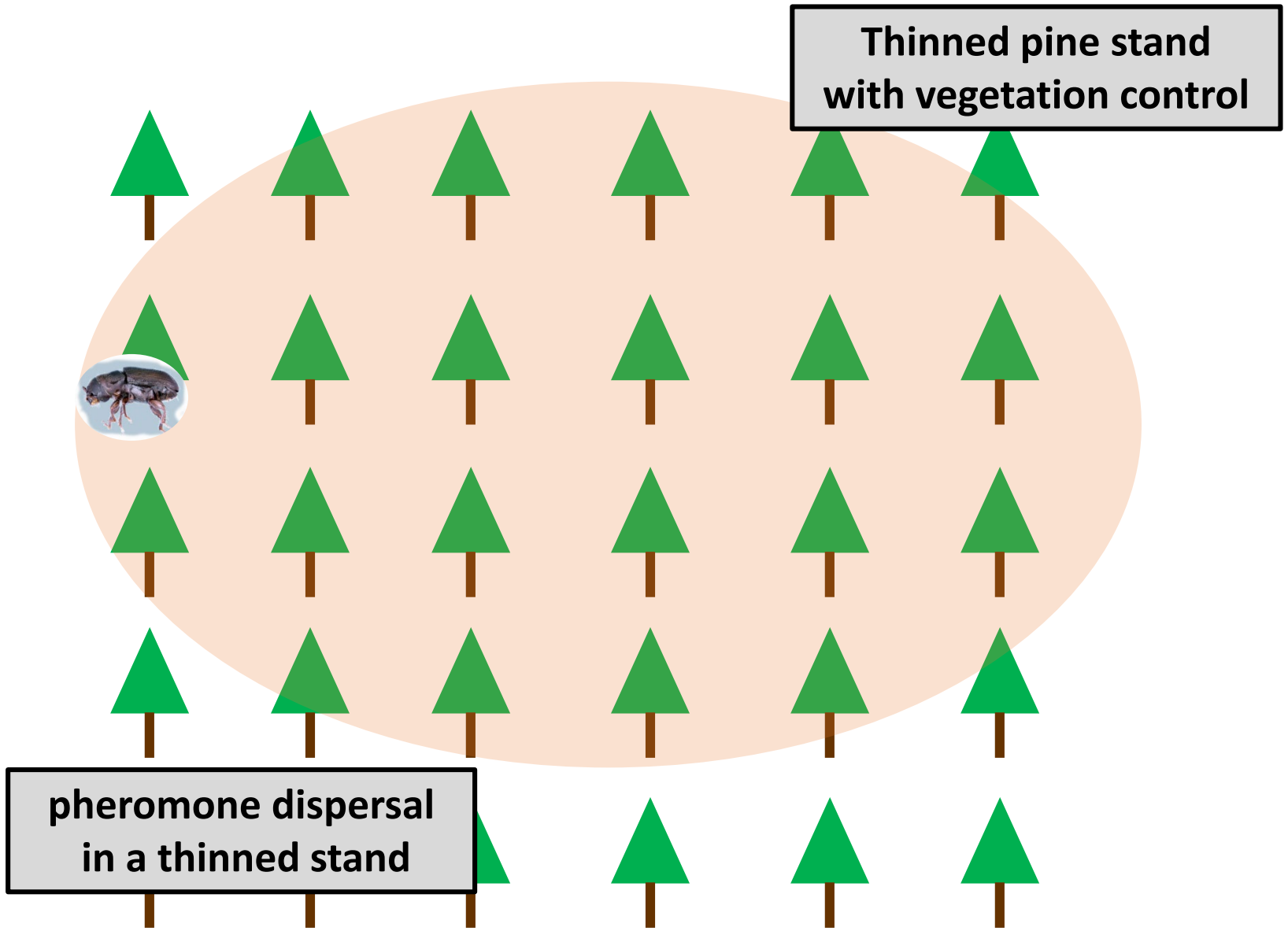

Unthinned pine stand


Unthinned pine stand
without open
understory



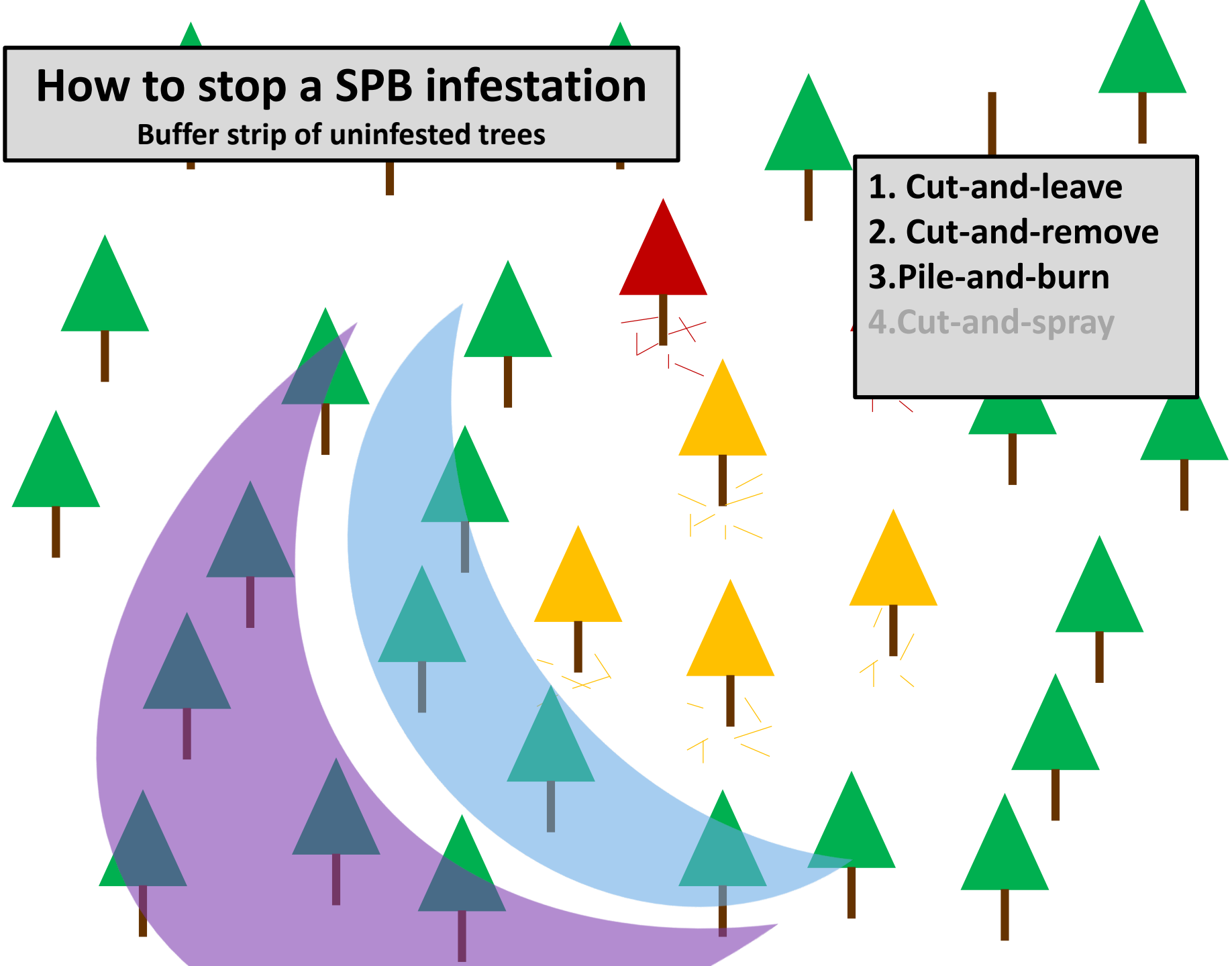

pheromone dispersal


pheromone dispersal


Thinned pine stand
with vegetation control
pheromone dispersal
in a thinned stand

How to stop a SPB infestation

Buffer strip of uninfested trees



1. Cut-and-leave
2. Cut-and-remove
3. Pile-and-burn
4. Cut-and-spray

Management Recommendations

- Maintain healthy stands
  - Thin at the proper times
- Do not cause additional stress to trees
  - Avoid soil compaction
  - Remove slash and damaged trees after a thinning
  - Be very careful about burning and thinning during a drought
- Have a management plan prepared by a registered forester
- Monitor your pine stands

Questions?

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Outreach
Warnell School of Forestry & Natural Resources
UNIVERSITY OF GEORGIA