Pests, stressors, and other problems affecting Trees and Other Woody plants

Diagnosing, Preventing, and Dealing

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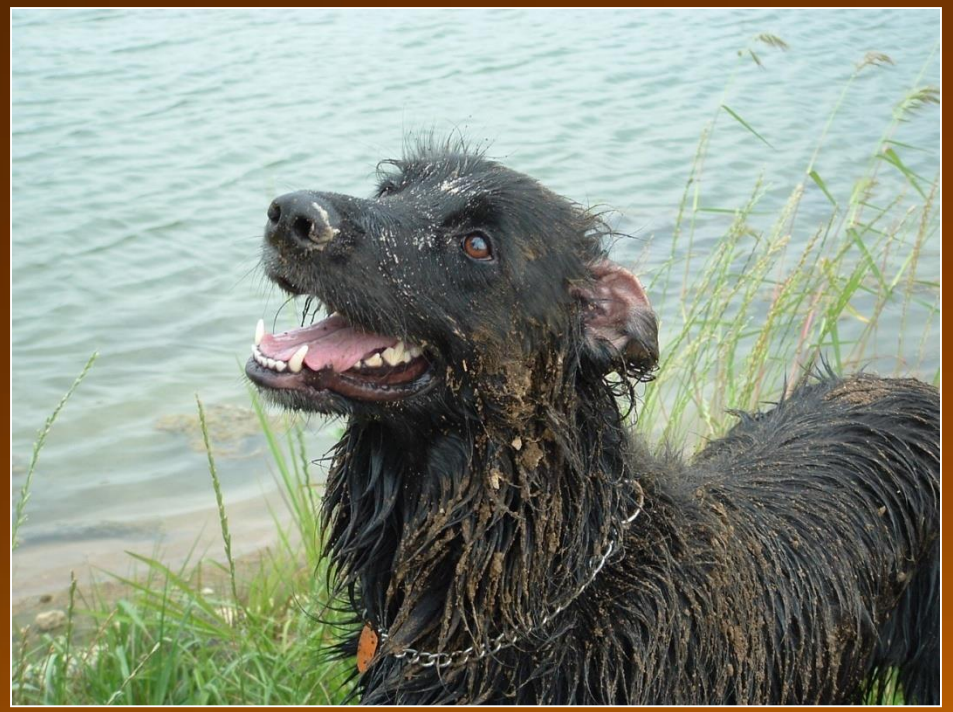
What's Up? What are we doing? Where are we going?



- What predisposes trees to problems/pests?
- Can you prevent them?
- Recognize common problems/pests
- What to do once you've got a them?

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Stress!

- Various Abiotic stressors:
  - Poor soil: compaction, poor drainage, erosion, reduced fertility
  - Drought vs. water-logging
  - Heat vs. cold
  - Salinity
  - Mineral deficiency vs. toxicity
  - Wind
  - Physical damage
  - Insufficient space and "difficult" site
  - Construction damage
  - Air pollution
- Various Biotic stressors
  - Insects and Disease
  - Human:
    - Improper plant selection
    - Improper installation/mulching
    - Improper maintenance

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- Stress interactions
  - Plant hormone and other chemical responses
  - Genetics
- How big of a problem?- It Depends!
  - Degree of stress
  - When in plant's life cycle
  - Plant species
  - Local environmental stressors **<u>may</u>** help plants adapt:
    - i.e. Dormancy, prolonged growth

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Stress avoidance may mean problem avoidance

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Design and Install Manageable & Functional Landscapes

- Design with the site in mind
- Design for long-term health
- Think in a new way…
- Think about watering and maintenance needs
- Who will do the maintenance?

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Does Size Matter?

YES

Install only What Can be Maintained

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One Million Trees Initiative
A Collaborative Effort to Preserve
Tree Canopy
10 Cities :: 10 Nonprofits :: 10 Years
TREES
GROWING. PROTECTING. EDUCATING.

More than just a hole

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To start:

- Use Good Stock, even if low bid required…
- Low bid should not mean accepting bad practices…

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Select site appropriate plants- Should fit customer's needs and wants

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Any site limitations?

- Some sites cannot support plants w/o serious modification
  - Soil quality- structurally and chemically
- Site history
- Extent of impervious surfaces
- Proximity of hardscapes
- Utilities?

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Sound site analysis and prep

- Soil, soil, soil!
- Exposure, drainage and other site factors

Site preparation = Healthy, stress resistant trees and other plants

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Proper installation is Key!

Too low

- What are the results?
  - Formation of adventitious roots
  - Water stress
    - too much
  - Pest problems

Too High

- Formation of adventitious roots
- Drying and dying roots

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Unprofessional/improper planting can lead to problems

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What about Staking?

- **Stake ONLY when necessary**
  - **When soil really wet and storms predicted**
  - **Some bare root trees**
  - **Extremely windy sites**
- **Proper materials**
- **Only as long as necessary!**

SOIL, AND RELATED ISSUES

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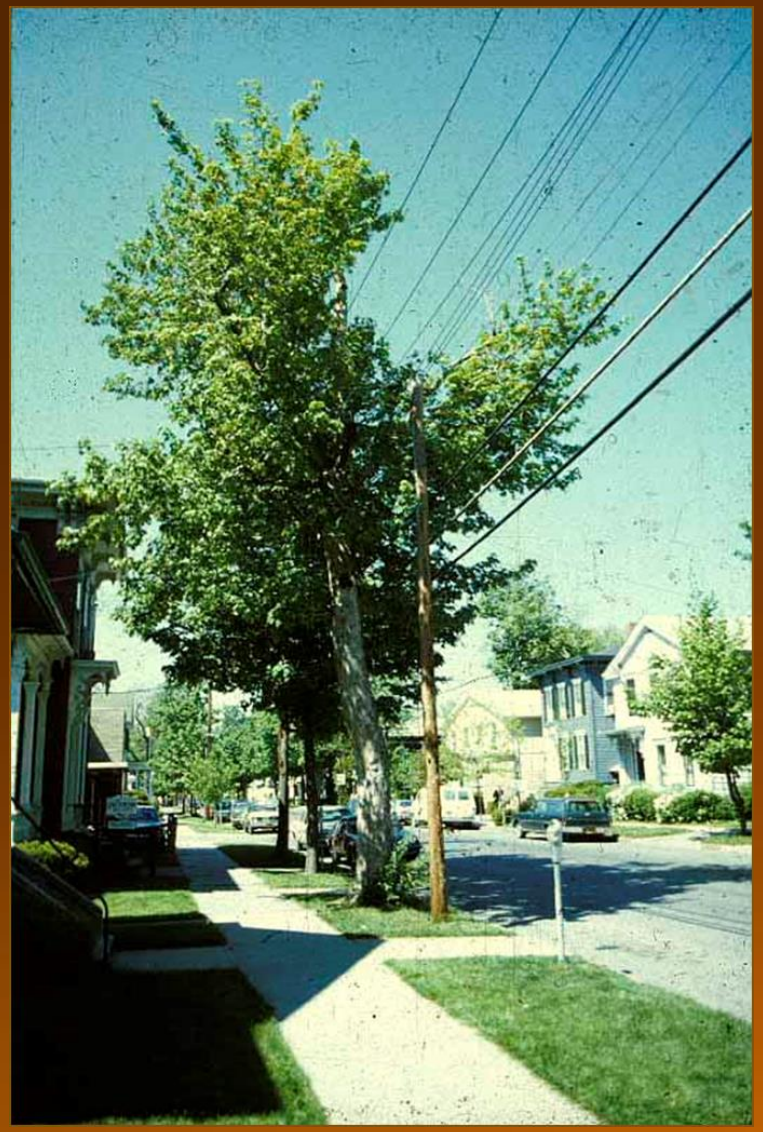
What about pH?

- Permanent change impossible; adjustments require annual effort
- Use species suited for existing pH
- May seem unimportant to short term survival
- Can lead to significant costs in maintenance and removal/replacement

Limited Space- Heat and Impermeable Surfaces



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Construction Damage

- Destroys soil structure- compaction
- Loss of soil and fertility
- Destruction of roots
- Mechanical damage
- Tree “isolation”- breaking or failing later

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- Equipment damage
  - Leads to long term decline
  - Some plants never recover
  - Leads to direct attack to various insects and disease

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What about Maintenance?

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Improper care = Slow, painful death…

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Proper, professional pruning goes a long way!

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Sometimes things are out of Our Hands…

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Salinity

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From Prevention to recognition

- Where on plant is problem exhibited?
- How extensive or significant?
- Are all plants effected?
  - 1 species or more?
- Signs of abiotic issues?
  - Recent weather activity?
  - Recent human activity?
- Evidence of insect or disease?
  - Actual insect, droppings, damage
  - Fruiting bodies
- Is treatment warranted?

IPM

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Control-before, during, after

- Diagnose/Isolate problem
  - Abiotic or biotic
  - How bad is the problem?
  - What are your treatment options?
- Weed and Insect control
- Remove infected or infested debris
  - Bury or burn
  - Compost- proper mgt. of pile key
- Remove affected plants
- Resistant varieties
- Prune out infected parts
- Mulch properly
- Soil test

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Chemical options

- Fungus-caused diseases
  - Protectant (preventative)
  - Curative (may tank mix w/ preventative)
- Virus-caused diseases
  - Destroy infected plants
  - Control insect vectors
- Bacteria-caused diseases
  - Copper-containing compounds or Bordeaux mixture (copper sulfate & lime)
  - Antibiotics
    - Inject routinely to treat, but not cure
  - Control insect vectors

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Trees & shrubs

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Leaf problems

- Powdery mildew, sooty mold, leaf scorch
- Interveinal chlorosis, no wilting
- Yellow, orange, or black powder filling “blisters”
- General browning/necrosis
- Random brown spots on both sides of leaf
- Uniform leaf spots, underside of leaf, epinasty- leaf distortion

- Fungal issues or drought and heat
- Nutrient deficiency or imbalance, root dysfunction
- Rust (fungal disease)
- Drought, salt injury, root-feeding nematodes, girdling roots, transplant issues
- Fungal or bacterial disease
- Chemical injury

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resolutions

- What's up w/roots?
- Treat for fertility or poor drainage
- Remove & destroy infected plants parts; avoid late day overhead irrigation
- Avoid using certain chemicals under hot, dry conditions
- Pick compatible plant companions

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resolutions

- Water deeply during drought
- Improve drainage
- Soil test!
- Proper watering after planting
- Check for girdling roots

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Leaf problems

- Leaves chewed or eaten
- Silk webs with caterpillars evident
- Galls present

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resolutions

- ID correctly
- Extent of damage?
- Treat when small
- Use registered insecticide
- No treatment for most galls- damage typically minimal

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Common insect problems

- Clusters of insects on trunks, stems & undersides of leaves
- Leaves chewed or eaten
- Light-colored tunnels or blotches
- Leaves stippled

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Insects that suck!

Aphids

- Attack new growth
- May cause stunting, deformation, discoloration and leaf death
- Some general feeders, some species specific
- Secret honeydew- sooty mold, feeds ants
- Control- oils & soaps, predators typically work well enough

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Heat (Drought)

2 spotted spider mite

- They like it hot!
- Drought may lead to increased populations; water where possible
- Treatments for other insects may increase populations (imidacloprid)
- Inspection and early treatment key!
- Use horticultural oil or soap; for high populations use miticides

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Improperly sited plants

- Azalea lace bug
  - Attacks both healthy and stressed plants
  - Plants in full sun more susceptible
  - Systemic chemicals useful; quick control is important

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Scale insects

- **Soft scale**: attached waxy coating; produces honeydew (leads to sooty mold)
- **Armored scale**: waxy coating not attached; no honeydew
- **Difficult to control**: treat at crawler stage with contact insecticides or treat with horticultural oils (dormant and summer) or systemic chemicals
- May lead to plant stress or dieback, even death
- Affects ornamental qualities of plants!

Magnolia scale and tulip tree scale

(*Neolecanium cornuparvum* and *Toumeyella liriodendri*)

Soft scales

- Heavy infestations can kill branches and trees
- Honeydew then sooty mold aesthetics issues
- Treat crawlers in Aug.-Sept. with insecticides

Gloomy scale
(*Melanaspis tenebricosa*)

- Armored scale
- Attacks maples (red!), sweetgum, grapes, native hollies
- Brought on by stress; can lead to tree death

Camellia tea scale

(*Fiorinia theae*)

- Armored scale
- Attacks camellias, hollies, osmanthus (tea holly) and olive
- Stunts growth, discolored foliage and defoliation, irregular growth

Twigs and branches

- Many small branches broken off
- Galls
- Proliferation of many branches at one point ("witches' broom")
- Cankers

Bark

- Freeze cracks → Large areas of split bark, no decay evident
- Sunscald, mechanical injury, lightning → Reduce vigor, scraped bark
- Fungal/bacterial cankers (secondary) → Large areas of split bark, decay evident
- Slime flux- bacterial disease → Sour-smelling ooze from cracks/holes
- Hypoxylon canker → Black, dieback of bark

Bark/trunk/roots

- Large, corky galls at trunk base or on roots
- Large dead areas, cavities in limbs and trunk
- Sunken cankers, plant may wilt, and exhibit poor growth
- Oozing sap
- Brown, gray or yellow crusty, leaf-like growths on stems and trunk
- Holes evident; tracks beneath bark
- Phytophthora bleeding canker
- Vascular wilt disease

Decay fungi and borers

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Dogwood Anthracnose

- Fungal pathogen: *Discula destructiva*
- Spots on leaves & flowers, necrotic areas; twig dieback; death
- Management:
  - Use resistant varieties
  - Maintain health
  - Apply fungicides prior to budbreak; every 10-14 days

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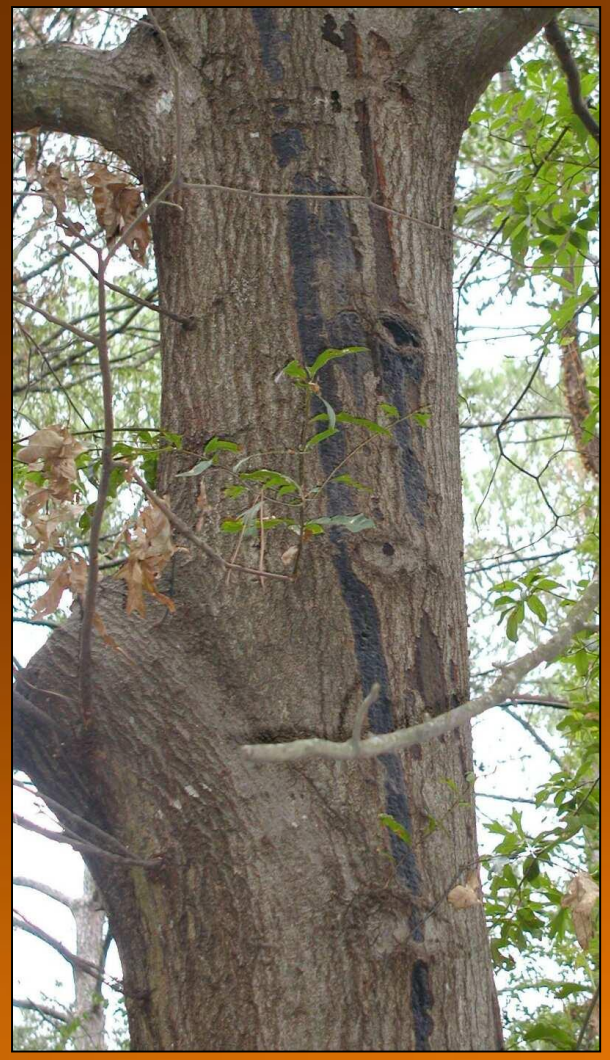
Hypoxylon canker (*Hypoxylon spp.)*

- Affects stressed (drought) trees
  - Oaks (red), hickory, maple, beech, sycamore, birch
  - Bud break delayed, smaller, chlorotic leaves, scorched/wilted
- Spore-bearing masses appear under bark, after drought
- Prevent stress!



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Phytophthora root rot

- Pathogen: (oomeycetes, not fungi)
  - Azaleas, rhododendrons, camellia, boxwood & junipers
  - Requires prolonged periods of high soil moisture
  - Stressed plants more susceptible
- Symptoms:
  - Stunted plant and small leaves; leaves or plant may wilt
  - Roots brown and rotted

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- Management:
  - Select resistant cultivars
  - Look at roots and only buy those with healthy white roots
  - Remove and destroy plants confirmed infected
  - No fungicide works to “cure”; may help adjacent, uninfected plants

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Phytophthora bleeding canker

- Most commonly attacked trees are beech, oaks, maples, magnolias and dogwoods
- Symptoms- spots or “holes” on trunk oozing sap
- Decline, early fall color and dieback
- Maybe wilt
- Does not cause decay, but can kill bark and outer sapwood
- Plant trees in well-drained areas, prevent stress

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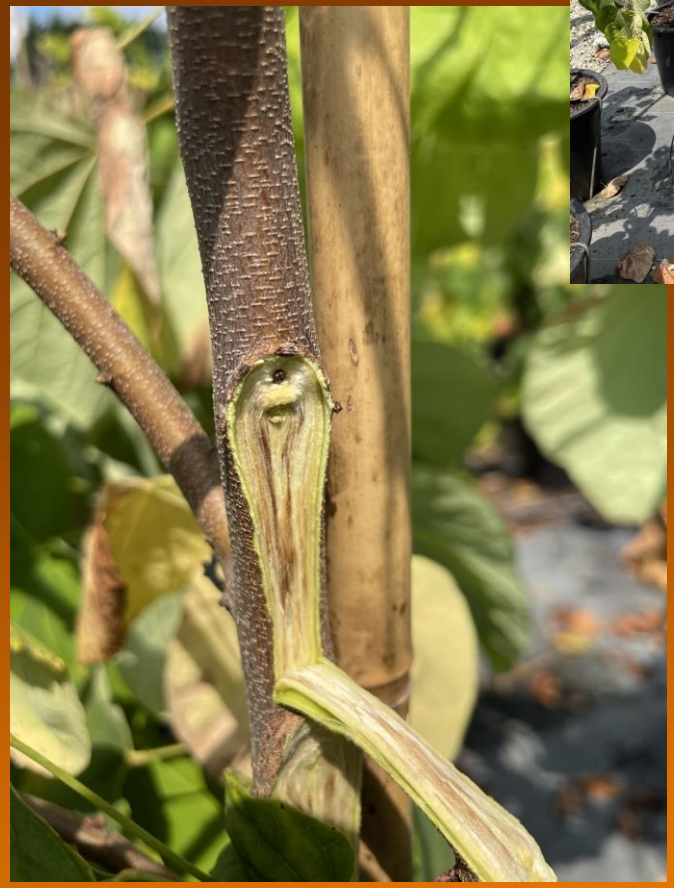
Vascular streak

- Caused by fungus *Rhizoctonia theobromae, but known as VSD*
  - Main hosts- redbud and dogwood, maybe maple
- Symptoms:
  - Chlorosis, scorched leaf margins
  - Stunting and wilting
  - Streaking or discoloration of vascular tissue
  - Death
- Treatment- none!



Slime flux

- Caused by bacteria; heat, drought, and wounding increases susceptibility
- Attacks apple, birch, elm, hemlock, maple, oak, poplar, willow
- Discolored wood, foul-smelling and unsightly
- Maintain good health, proper water management, minimize wounding

Pipes do not work and cause additional wounding

Armillaria Root Rot (*Armillaria spp.)*

- Many hardwoods and conifers infected
  - Spreads via rhizomorphs, root-to-root contact and airborne spores
  - Reduced growth, early fall color, dieback, windthrow
- Stressed trees highly susceptible
- Select proper plant for site; maintain plant health- water and fertilize as needed

Asian Ambrosia beetle

- Problem in nursery, orchards, & landscapes
- Attacks stressed, damaged, newly transplanted trees & healthy, thin-barked branches
- Introduces Fusarium
- Remove heavily infested parts or plants
- Use Astro, bifenthrin; avoid planting Styrax, Yoshino cherry, 'Stellar Pink' and 'Milky Way' dogwood

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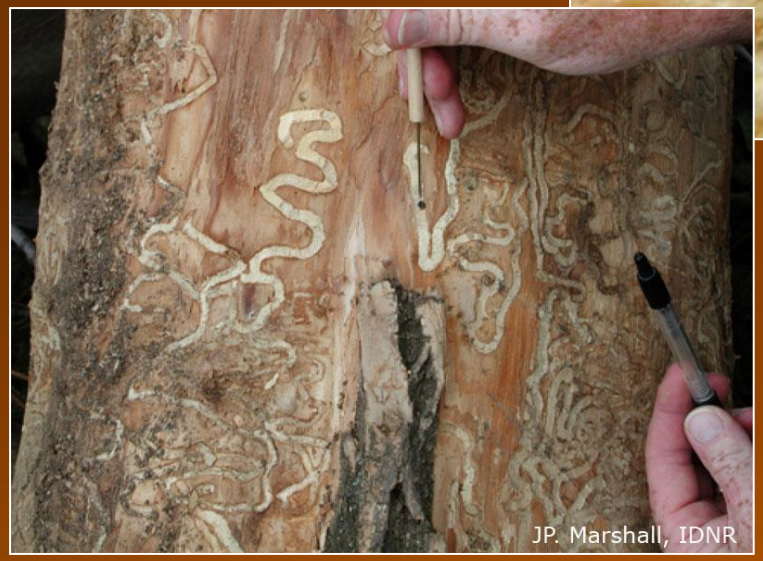
Emerald ash borer

(*Agrilus planipennis*)



- Attacks healthy ash of all species native to NC
- Also attacks fringetree
- Eradication and burning of trees necessary
- A few chemical controls available

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Tree decline from EAB attack

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Wrap Up

- Prevent stress
  - Keep plants healthy
  - Site prep, sufficient soil, good plant selection, installation and maintenance
- Practice IPM
  - GET GOOD AT IT!

- Be prepared for the inevitable…
  - Droughts will come
  - Wet seasons will come
  - Weather fluctuations are common place
- Healthier plant better able to tolerate stress!