

# Common Tree Diseases – Signs, Symptoms and Treatments

Online Professional Development Training  
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# Overview of “Common” Tree Diseases

## Caused by Fungi:

- Cytospora Canker
- Phomopsis Blight
- Rhizosphaera Needle Cast
- Verticillium Wilt
  
- Thousand Cankers

## Caused by Bacteria:

- Slime Flux
- Bacterial Leaf Scorch



# But first.....a few reminders

- ✓ Plant disorders are any abnormal growth or development in a plant
- ✓ Plant diseases are plant disorders that are specifically caused by infectious microorganisms
- ✓ Many different living and non-living entities cause harm to plants
  - more than one problem can occur at a time
  - Abiotic disorders predispose plants to infection by pathogens



# More reminders.....

- ✓ Symptoms are not specific to causal agent
- ✓ An accurate diagnosis requires:
  - early detection
  - a complete investigation of the plant, the management practices, the environment
  - may require a lab analysis





The Urban Environment  
is Stressful for  
Trees!!!





De Baca County CES



NMSU-CES

The urban environment



is stressful for trees!

Natalie Goldberg, NMSU





1993

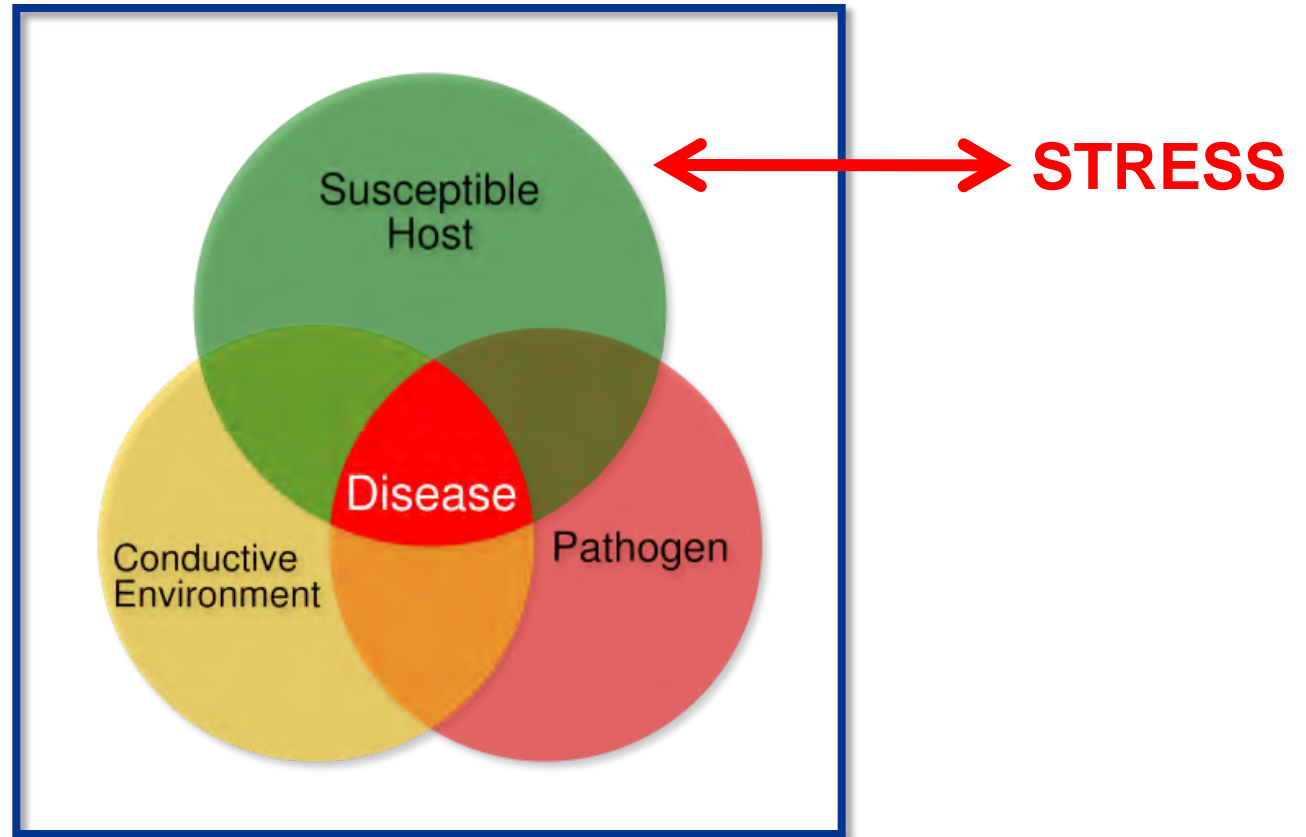


1999



Environmental Stress  
is the #1 Problem  
in Urban Trees!!!

# The Plant Disease Triangle



# Bearer of Bad News.....

- Plant diseases are *very difficult* to **cure**
  - Especially once the disease is well established (systemic)
  - When symptoms are clearly noticeable, it may be too late to be effective with treatment
- Management strategies are usually aimed at **reducing stress** and **prolonging life** (not preventing death)

# Treatment Considerations

- Critical evaluation of the situation is necessary
  - Likelihood of treatment success (improved appearance, prolonged life)
  - hazardous nature of the tree (reduce risk)
  - Cost of treatment(s) – labor, equipment, materials...
    - Tree value
  - Impact on environment and animals

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# Cytospora Canker

- Fungal disease caused by *Cytospora* spp.
  - Opportunistic fungus (attacks weak, stressed trees)
    - Freeze damage, sunburn, drought, low fertility, physical injuries, etc...
- Huge host range: cottonwood and other poplars, willows, fruit trees, elm, conifers (spruce), pecan....
  - However, *Cytospora* spp. are fairly host specific



# Cytospora canker

- Infection develops slowly
  - By the time its noticeable, disease is well established
- Forms sunken lesions that develop into cankers





# Cytospora Canker

- Fungus sporulates in cankers
- Cankers may ooze
- Eventually (years) cankers girdle limbs which results in dieback



# Management of Cytospora

- Prevent infection by preventing stress...
  - Promote strong, healthy trees with proper water and fertilizer practices
  - Prune out injured and diseased branches
    - Do not prune when bark is wet
  - Cleaning pruning tools
    - 10% bleach solution (use fresh)
    - Rubbing alcohol
  - Try to prevent physical injuries

# Phomopsis Blight and Canker

- Dieback, blight and canker diseases on many woody plants
  - Hardwood trees (cottonwood), junipers, cedars, pines, shrubs, small fruits....
- Weak pathogen – affects stressed plants
- Caused by *Phomopsis* spp.
  - Species are fairly host specific



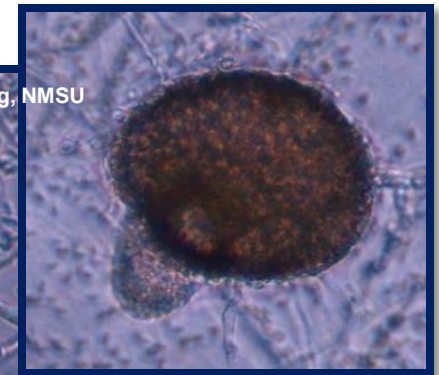
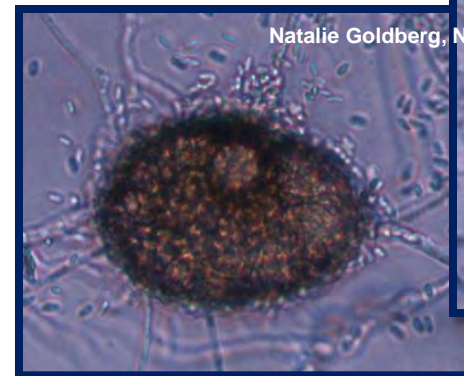
# Phomopsis Blight and Canker

- Small stems girdled and killed
- Cankers develop on larger stems
- Landscape plants are rarely killed, but become unsightly with numerous dead branches
- Insufficient water causes similar symptoms



# Phomopsis Blight and Canker

- Invades only through natural openings or wounds
- Fungus sporulates in cankers and spores are disseminated by wind, water (rain, sprinklers), insects, pruning



# Management of Phomopsis

- Avoid unnecessary injuries
- Reduce stress
- Proper water and fertilizer management
  - Avoid wetting foliage or water early so that foliage dries quickly
- Prune out infected twigs and branches
  - Clean tools with bleach or alcohol
  - Do not prune when branches are wet

# Rhizosphaera Needle Cast

- Affects Blue Spruce and other conifers
- Causes needle discoloration (yellow to reddish-purple to brown)
- May be confused with winter injury and drought stress



# Rhizosphaera Needle Cast

- Fungus produces black fruiting bodies on infected needles in spring





# Rhizosphaera Needle Cast

- Severe infections result in many bare branches
- Symptoms usually develop from bottom to top and inside out
- If left untreated, the tree usually dies



# Management of Rhizosphaera

- Provide adequate water and fertilizer
  - Avoid wetting the foliage
- Promote good air circulation around trees by open spacing, selective pruning, and removing brush, grass and weeds from around trees
- If caught early, fungicide treatment can be very effective
  - Use Bordeaux mixture 8-8-100 (8 lbs. Hydrated lime, 8 lbs copper sulfate and 100 gal of water).
  - Or chlorothalonil fungicides
  - Apply when new growth is half developed and again when needles are full length

# Verticillium Wilt

- Vascular disease caused by the soil-borne fungi, *Verticillium dahliae* & *V. albo-atrum*
- Huge host range:
  - Catalpa, Ash, Elm, Maple, Pistachio, Redbud, Russian Olive, fruit trees
- Fungus invades through the roots
- Impairs the xylem vessels (water-conducting tissue)
  - Yellowing, wilting, defoliation, vascular discoloration





# Management of Verticillium Wilt

- Management is very *difficult* – infected plants will eventually die
- Life of plants infected with a mild strain may be prolonged with good water and fertilizer management
- Prevention: avoid injury to crown and roots when planting, provide adequate water and fertilizer
- Replant diseased areas with non-hosts

# Slime Flux (Bacterial Wetwood)

- Caused by several species of bacteria
- Enter plant through wounds or natural growth cracks
- Fast growing trees are especially susceptible – willows, elm, cottonwood, Mulberry, etc.
- Slime produced is toxic to plants







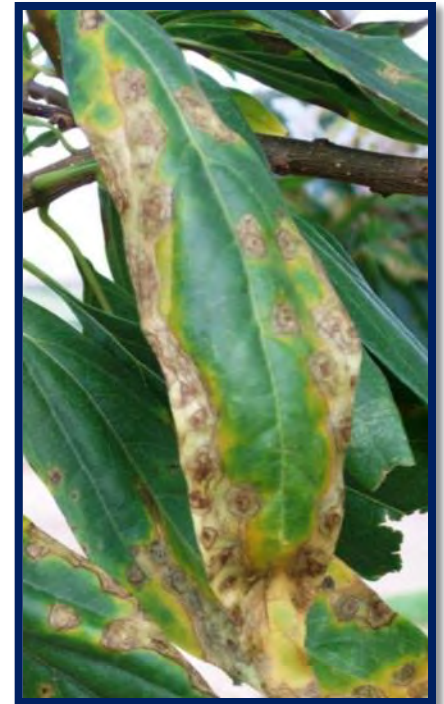


# Management of Slime Flux

- Once infected, there is no cure
- Proper water and fertilizer management will help to reduce the affect of the bacteria and the amount of slime produced
- Slime can be washed off trunk and limbs – this will reduce the toxic affect of the bacteria

# *Xylella fastidiosa* (Bacterial Leaf Scorch) Update

- In NM, first discovered in chitalpa in 2006



Photos: Natalie Goldberg, NMSU

# *Xylella fastidiosa*

- Leaf Scorch Symptoms
  - Pierce's Disease of Grapes
  - Almond Leaf Scorch
  - Plum leaf Scald
  - Pear Leaf Scald
  - Bacterial Leaf Scorch of Shade Trees
  - Oleander Leaf Scorch
  - Coffee Leaf Scorch
  - Pecan Bacterial Leaf Scorch
- Stunt Symptoms
  - Alfalfa Dwarf Disease
  - Phony Peach Disease
  - Periwinkle Wilt
  - Citrus Variegated Chlorosis



# *Xylella fastidiosa*

- Found in grapes (Pierce's Disease) the same year
- Research showed the bacterium to be the same in both plants – *suggesting* transmission between hosts
  - Disease is vectored by insects (sharpshooters and spittle bugs).....no specific vector has been identified in NM



Photos: Natalie Goldberg, NMSU



# Are all Chitalpa trees infected?

- Yes (probably)
- Chitalpa is propagated by cuttings
- Plants appear to be systemically infected.
  - Suckers – although appearing healthy, are infected
- Cuttings taken from asymptomatic plants will produce infected plants



# *Xylella fastidiosa* Update



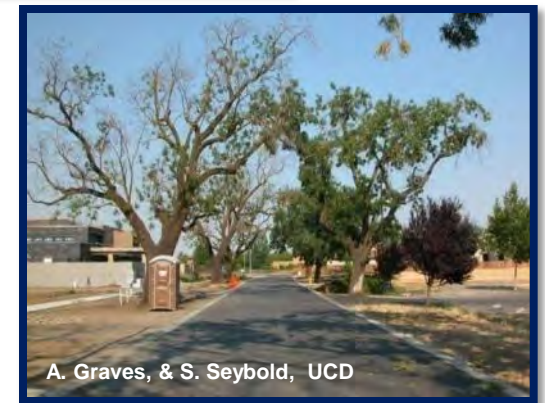
Found in catalpa in 2008  
(same as chitalpa strain)



Found in peach in 2010  
(different strain)

# Thousand Cankers Disease Update

- Disease of black walnut (and other walnuts)
  - observed in Colorado since 2003
  - Disease confirmed in CA in 2008
  - May have been responsible walnut tree death in Espanola, NM (2001)





June 2008



September 2008



June 2009

The progression of decline of  
Infected black walnut trees



# Disease Complex (Fungus/Insect)

- Disease is caused by a fungus associated with twig beetles
- Causal fungus is *Geosmithia morbida*
- Walnut twig beetle (*Pityophthorus juglandis*)



N. Tisserat , Colorado State University



J. LaBonte, Oregon Dept. Ag.

1.5-1.9 mm



S. Seybold, UCD

# Thousand Cankers Disease - Symptoms



Photos: Natalie Goldberg, NMSU



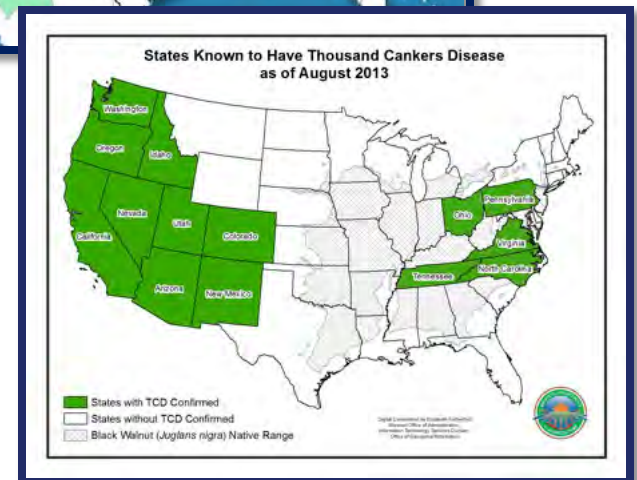
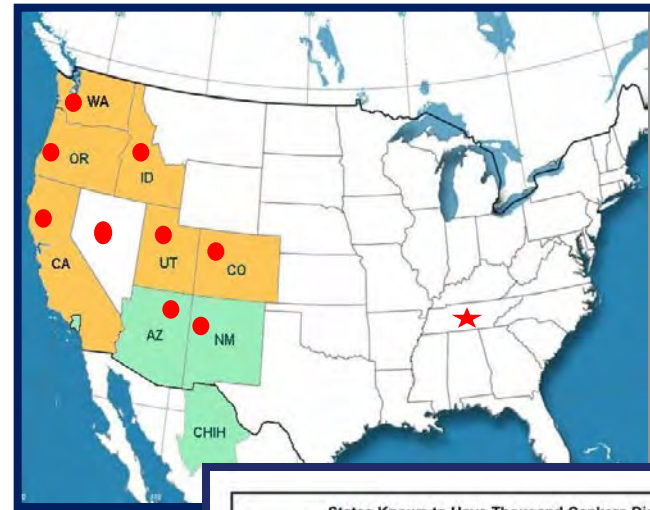
# Thousand Cankers Disease in NM

- In 2001, a large number of mature black walnut trees died in Espanola
- Evidence of beetles, but presumed cause of initial decline was drought
- The disease has now been confirmed in Grant and Bernalillo County



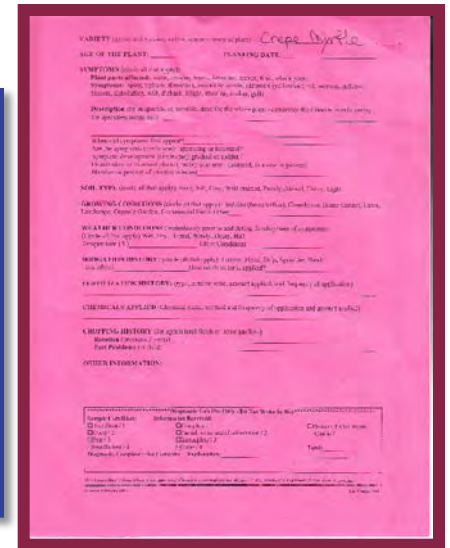
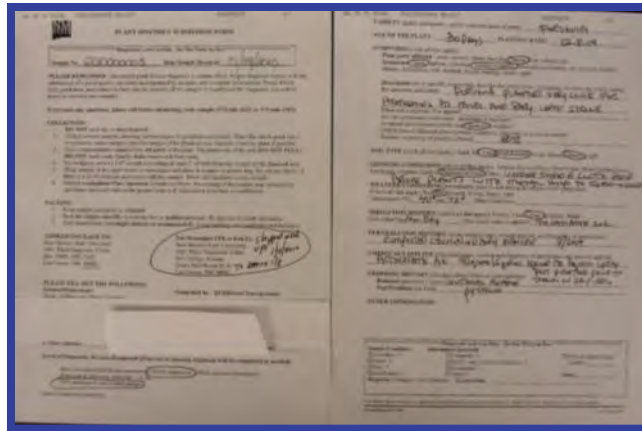
# Distribution of Thousand Cankers Disease

- By 2008, the disease is confirmed in most of the Western
- In 2010, the disease is confirmed in Tennessee
- Now affecting English Walnut in CA



# The Diagnostic Process

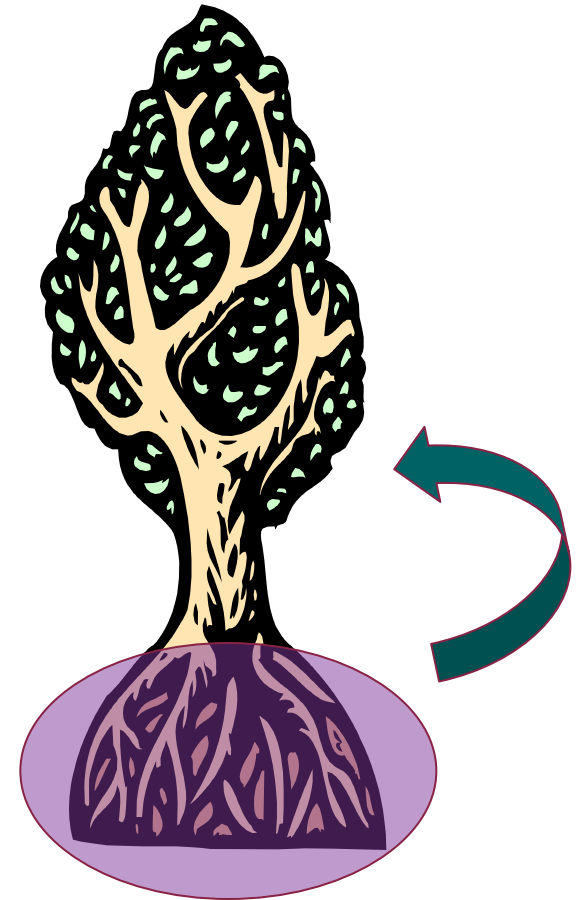
- An accurate diagnosis depends on:
  - Early detection of plant problem – routine examination of the plant
  - Examination of good specimens and/or photos
  - Obtaining accurate information



Photos: NMSU-Plant Diagnostic Clinic

# Diagnostic Challenges with Trees

- LARGE, Slow-growing, perennial plant
  - Symptoms may develop slowly over a long period of time
- Symptoms may occur away from the site of infection
  - Hard to submit the whole plant for examination (in the lab)
  - May be hard to collect an appropriate piece of the plant for lab tests



# Diagnostic “Do’s” for trees

- Do take good, **in focus**, photos of the tree in it’s environment
- Do collect samples of as many parts of the plant as possible - leaves, twigs/branches, vascular tissue, and roots
- Do a complete assessment of the plant – examine leaves, branches, trunk and roots
- Do get as much information on tree care and environmental conditions as possible



# Diagnosing Plant Disorders

- Diagnosis is a team effort
- NMSU Plant Diagnostic Clinic:
  - <http://plantclinic.nmsu.edu>
  - Forms and information for submitting samples
  - Publications, presentations, links, etc.
- Rapid delivery to the clinic can be important
  - Grant funding obtained to assist counties with postage for overnight delivery (Index #123774 / Fund #607406)

