

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!



1993

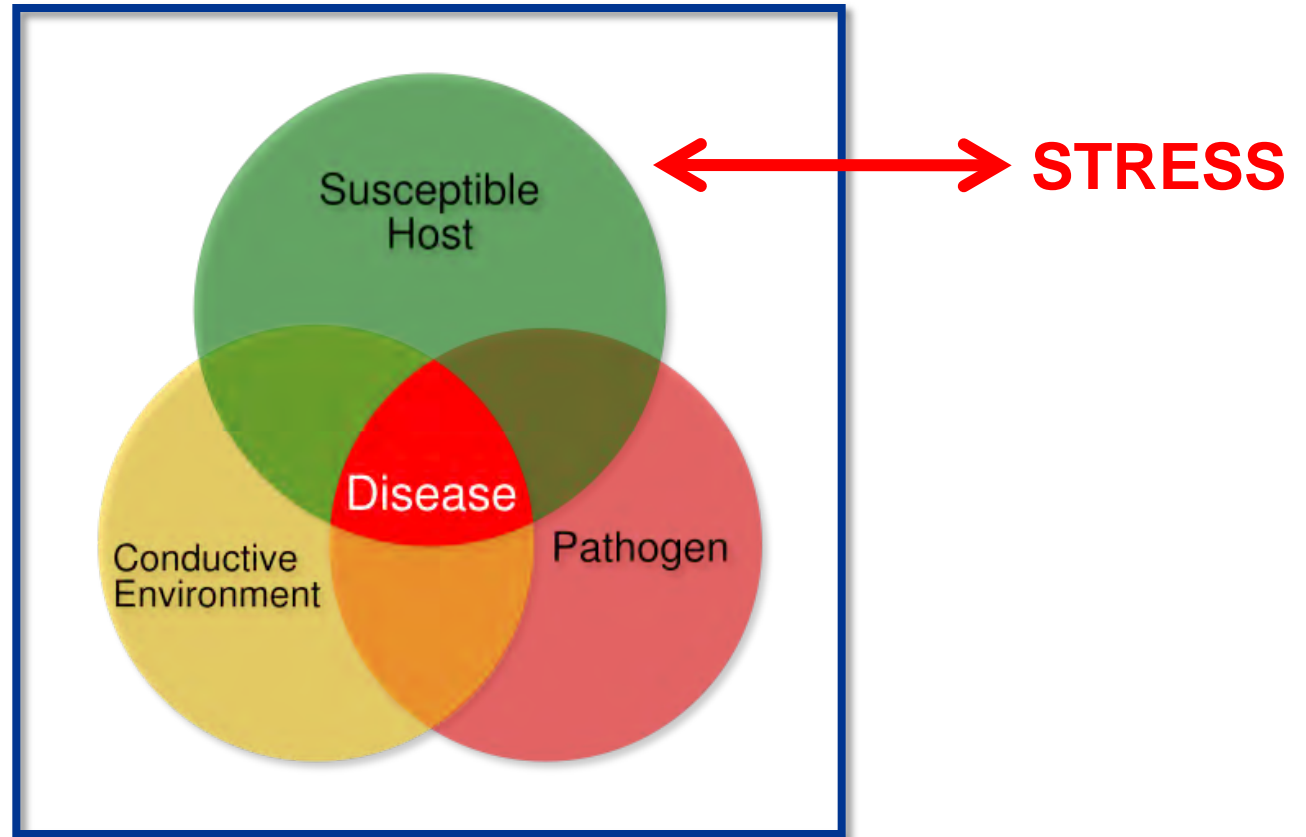


1999



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



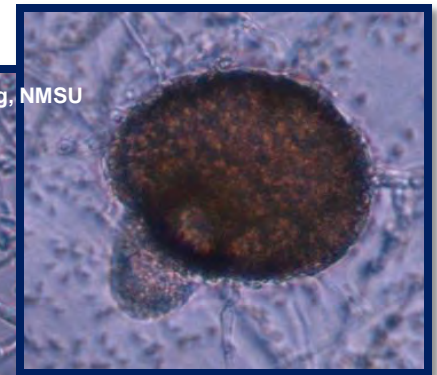
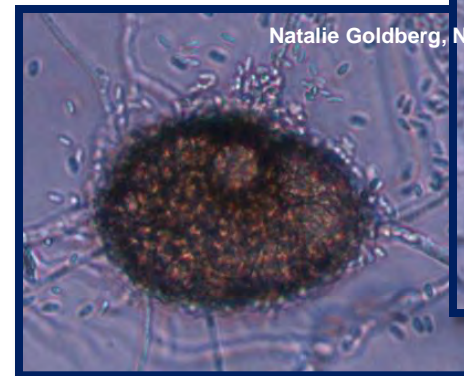
Phomopsis Blight and Canker

- 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





Judy Nickell, Bernalillo Co. Master Gardener



Judy Nickell, Bernalillo Co. Master Gardener



William Jacobi, Colorado State University, Bugwood.org

5366743

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





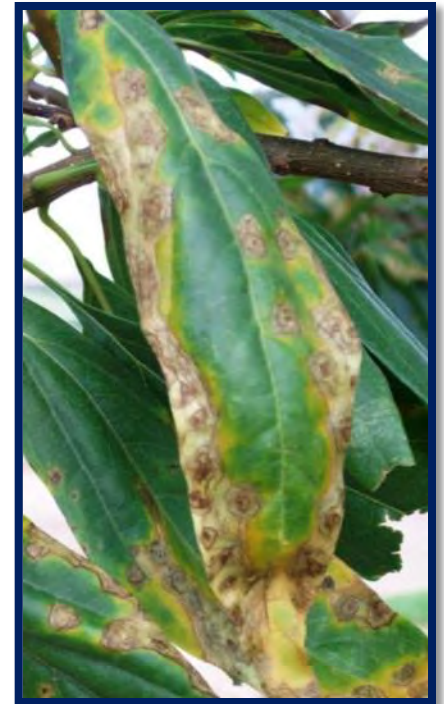


Management of Slime Flux

- 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



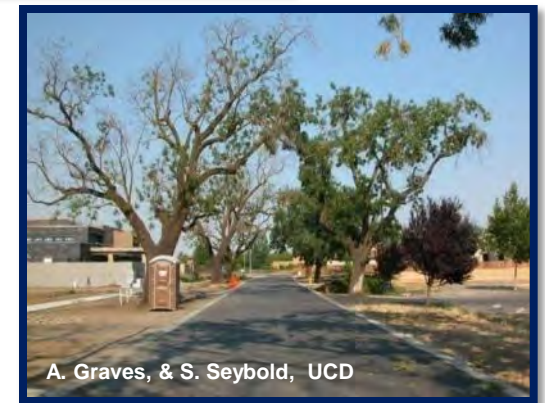
Found in catalpa in 2008
(same as chitalpa strain)



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



The progression of decline of
Infected black walnut trees

photos by Ned Tisserat & Whitney Cranshaw, Colorado State University



September 2008



June 2009

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



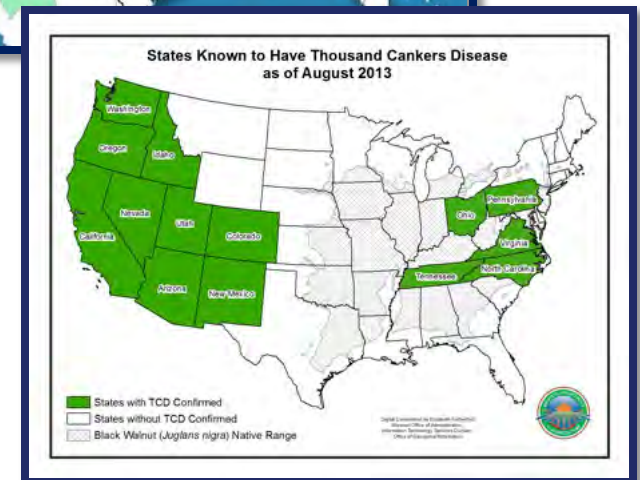
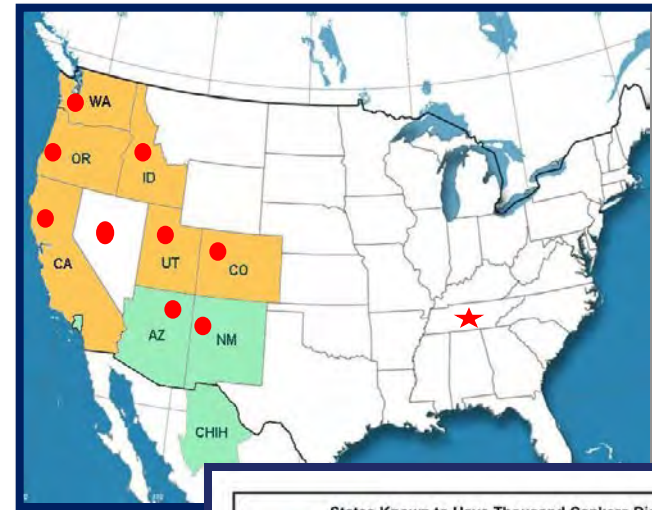
Thousand Cankers Disease in NM

- 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



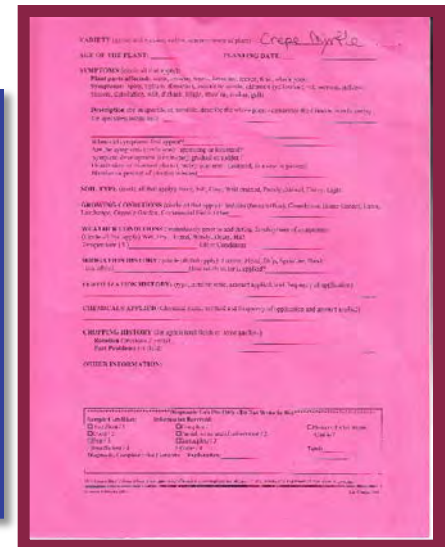
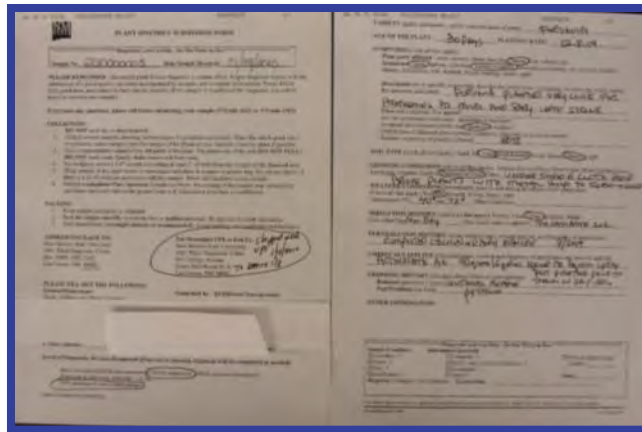
Distribution of Thousand Cankers Disease

- 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

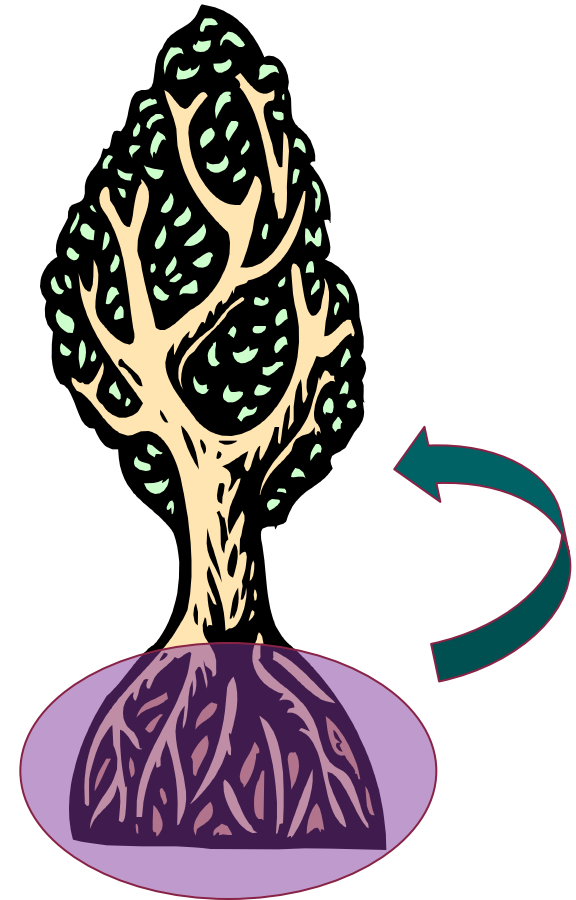
- An accurate diagnosis depends on:
 - Early detection of plant problem – routine examination of the plant
 - Examination of good specimens and/or photos
 - Obtaining accurate information



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)

