Most Common Fruit & Nut Tree Problems in Texas

and how to solve them...

Monte Nesbitt
Resources for Problem Solving

• Texas Plant Disease Diagnostic Laboratory
  – 979-845-8032
  – [http://plantclinic.tamu.edu](http://plantclinic.tamu.edu)
  – Routine sample=$30.00 fee

• Texas AgriLife Extension Soil, water and forage testing laboratory
  – 979-845-4816
  – [http://soiltesting.tamu.edu](http://soiltesting.tamu.edu)
  – Soil sample with minors=$17.00
  – Leaf analysis with minors=$18.00

• Your Local Texas AgriLife Extension Agent!
Fireblight of Pears & Apples

- Reduce or eliminate fertilizers containing nitrogen
- Train trees (rather than prune) to discourage vertical growth
- Treat with AG-Streptomycin (MANA Crop Protection Inc.) during bloom
  - 4 oz/50 gal water (22.4% Active Ingredient)
  - Spray every 3-5 days during bloom and 10-14 days after petal fall.
Cotton Root Rot

- Affects apples, peaches, pears, grapes, citrus, other
- Avoid planting on old cotton farms
- High pH soils with low freezing incidence are at risk (7.0-8.5)
- Acidify soil
- Increase soil organic matter content
- Select resistant rootstocks where possible
Cotton Root Rot resistant rootstocks

- Pecan---None identified
- Apple---None
- Pear---Calleryana
- Grape---Champanel, Kober5BB
- Citrus---Sour orange
- Peach---??peach-almond hybrids (better in calcareous soils)
Peach fruit problems

• Small Fruit: Too many fruit, not enough water.
• Split pits: Too few fruit (overthinned), early-ripening varieties, inadequate chilling
• Catfacing: Stinkbug injury
• Plum curculio
Plum curculio

- Adults overwinter in ground debris, fencerows, etc.
- Plums, nectarines targeted early, peaches later
- Adult attraction to fruit and Egg lay begins after shuckspli
- Adults chew hole in fruit and then deposit
Plum curculio control

- Regular insecticide treatments from petal fall to harvest
- Sevin, Imidan, or Permethrin, 10-14 day intervals
- Dislodge and capture adults by jarring trees in early morning onto a sheet underneath the tree.
- Remove infested fruit that drop from the tree and destroy.
Proper peach fruit spacing

Univ. of AZ
Blackberry problems

- Stinkbugs, leaf-footed bugs.
- Cercospera leaf spot
- Raspberry crown borer
Green June Beetle

Photo: NC Small Fruit, Specialty Crops
Permethrin products

• Broad spectrum activity
• Very effective on weevils, beetles, aphids, grasshoppers
• Kills beneficial insects too

All EPA-registered pesticides must have the fruit crop you are treating on the label. Always follow label restrictions and directions!

Apples, peaches, pears, pecans

Apples, peaches, pears
• Kaolin clay particle film
  – Can be difficult to mix—read label!
• Reduces fruit surface temp
• Irritates some insects, forces grooming or respiration problems
• OMRI/Organic culture approved
• Washes off with rain
• Rate of ¼ to ½ lb per gallon of water
• Has shown some efficacy on weevils, curculios, stinkbugs
  – Trial data variable
Brown Rot of Stone Fruits

• Four categories of fruit can be infected
  – Aborted/non-abcsised hangers,
  – Late-thinned fruit on ground
  – Green, immature fruit
  – Mature fruit from harvest to post-harvest

• Optimum temperature is 77 oF

• Free water from dew or rain drives infection

• Or Relative Humidity of 94% or greater.
Brown Rot Management

• Remove wild plum thickets near peach orchards
• Bury or remove fruit mummies in or under trees.
• Do not allow mature fruit to over-ripen on the tree
• Grow early-season varieties
• Fungicides: 2-3 sprays during bloom and 2-3 sprays on developing fruit
  – Captan 50 (3-4 tblsp/gal)
  – Bonide Fruit Tree Spray=captan, malathion and sevin
  – Commercial products: Bravo (Chlorthalonil), Indar (Fenbuconazole)
Peach Tree Borer

- Larva overwinter in tree feeding sites
- Emerge from May to November
- Peak from mid July to mid August
- Use pheremone traps to track emergence and control period
- Treat trunks with insecticide
  - Chlorpyrifos (best), malathion, sevin, permethrin, esfenvalerate
- Exclude or repel adults
White Peach Scale

- Reduces tree vigor and productivity; and causes limb dieback
- Treat during dormancy with 1-3 applications of dormant oil
Blackberry Disease Problems

Orange Rust [*Gymnoconia peckiana*] Thornless Types Most Susceptible

Remove infested plants from the planting
Double Blossom

Thorny Types Most Susceptible
Spring

Fungus sporulates on pistils and stamens of infected flowers and conidia infect primocanes

Infected flower buds are usually elongated, larger and more red in color than healthy buds

Early Spring

In early spring, 4-7 laterals develop from each infected bud on floricanes resulting in witches' brooms. This is the most obvious symptom of rosette.

Summer

No fruit develops on infected canes

Infected primocanes grow with no apparent symptoms

Mycelium grows within lateral bud, filling the spaces between embryonic bud elements

Late Summer

Fruiting canes die

Primocanes continue to grow

Late Fall - Winter

Bud proliferation is induced in infected buds
Double Blossom control

• Plant resistant varieties
• Eliminate wild dewberries near the planting
• Prune out rosetted shoots in young, new plantings
• Mow severely infected plantings one foot above ground.
• Treat primocanes 1ft and taller with fungicides
  – Abound, Pristine, Switch
Problems attacking several crops
Crown Gall (agrobacterium tumefacians)

Infects root wounds in nursery or after planting. Spread by plows, mowers, or other equipment.

Trees lose vigor and may be less productive than normal.
Crown gall control

- Healthy Nursery/planting stock
- Avoid trunk and root wounding
- GallTROL—chemical drench
Nematodes

- Inspect nursery trees prior to planting
- Soil Test to check levels.
Root knot nematode
*Meloidogyne partityla*

---Exclusion

---Increased management, limit nut load

---Freeze vulnerable?

---Temik?

---Terminate orchard

Slide/Pictures: Mark Black
Powdery Mildew

Pecan: Only severe cases need treatment with sulfur or fungicide (Stratego)

T. A. Lee
Citrus problems
Citrus Leafminer

- Attacks summer growth; Spring flush growth escapes.
- Not fatal; leaves still function at reduced capacity
- Control is by insecticides:
  - Imidacloprid: soil or foliage applied
  - Spinosad
  - Frequent applications of malathion, oil, and neem

Orangedog: Swallowtail Butterfly Larvae

minor foliage feeder
Spinosad Products

- Extract from rare actinomycete reportedly collected from soil at an abandoned rum distillery on a Caribbean Island
- Causes nerve excitation
- Must be ingested; low impact on predatory insects
- Some products approved for Organic cert.
- Residual activity questionable
Citrus Rust Mite

- Tiny, near-microscopic mite
- Tarnishes the peel.
- Edible portion not affected.
- Control with Horticultural Oil-July, August, Sept.
Leaffooted Bug

Control with Malathion, Permethrin Dust (Bayer Advanced), Surround Crop Protectant
CONTROL WITH OIL SPRAYS!

Citrus Red Spider Mite

Citrus Whitefly

Scale

Mealybugs
Important Oil Information

• Ultra Fine Oil is not as effective as 435 Oil at the same 1-2% concentrations.
  – UF must be 4% to equal 2% 435 Oil.

• Phytotoxicity can occur under the hottest and driest conditions
  – Make sure plants are well-watered
  – Beware of tank mixes and unclean spray tanks

• 435 Oils that can be found from various Ag Suppliers
  – Mite E Oil and Sol Oil 97: Helena
  – Glacial: (Loveland Industries): UPI
  – Damoil (Drexel):
  – Saf-T-Side (Brandt Consolidated): various suppliers
Asian Citrus Psyllid

Natural angled posture on plant surface
Adult

Honeydew

Nymphs
Psyllid Life Cycle: 15-47 days

- Eggs: 2-5 days
- Nymphs: 10-40 days

- 9-10 generations per year
- Psyllids overwinter as adults in TX

[http://ucanr.org/freepubs/docs/8205.pdf]
## Psyllid Control for Homeowners

<table>
<thead>
<tr>
<th>Material</th>
<th>Life Stage Controlled</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imidicloprid</td>
<td>Adult, Nymph, systemic</td>
<td>Drench soil according to label</td>
</tr>
<tr>
<td>(Bayer Advanced Fruit-Citrus-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetable Insect Control)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malathion 50%</td>
<td>Adult, Nymph</td>
<td>3-4 tsp/Gallon</td>
</tr>
<tr>
<td>Permethrin or Pyrethrum</td>
<td>Adult, Nymph</td>
<td>Varies with product</td>
</tr>
<tr>
<td>Neem</td>
<td>Repellant</td>
<td>Use in combination with other products</td>
</tr>
<tr>
<td>Horticultural Oil</td>
<td>Egg, Nymph, (Adult–suppression only)</td>
<td>Ultra Fine (412): 2-4 oz/Gal</td>
</tr>
<tr>
<td>Soap</td>
<td>Nymph, adult</td>
<td>2-3% rate; liquid hand or dish detergent only or commercial RTU product</td>
</tr>
<tr>
<td>Surround Crop Protectant</td>
<td>Repellant</td>
<td>½ pound/gal water</td>
</tr>
</tbody>
</table>
Sweet Orange Scab

- First U.S. detection; Harris Co. on lemons and tangerines (7/2010)
- Detected on satsuma in Orange Co.
- Detected on lime in Orleans Parrish, LA, and 15 other parishes
- Detected in Hidalgo Co., Tx
Prevention is with fungicides

**Sweet Orange Scab**

**Sour Scab**
# Fungicides and Timing

<table>
<thead>
<tr>
<th>Product</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abound, Headline, Gem (Strobilurins-various)</td>
<td>2/3 Petal Fall and 14 days later</td>
</tr>
<tr>
<td>Enable (fenbuconazole)</td>
<td>Same as above</td>
</tr>
<tr>
<td>Liquid Lime Sulfur</td>
<td>Late Winter—very early budbreak</td>
</tr>
<tr>
<td>Fixed or Neutral Copper</td>
<td>Early budbreak and/or early fruit sizing period</td>
</tr>
<tr>
<td>– (Calcium polysulfide)</td>
<td></td>
</tr>
<tr>
<td>– BasiCop</td>
<td></td>
</tr>
<tr>
<td>– Kocide</td>
<td></td>
</tr>
<tr>
<td>– Others</td>
<td></td>
</tr>
</tbody>
</table>
Pecan Scab

- Plant Resistant Varieties
- Plant on wide spacing for air-flow & faster air drying.
- Spray preventatively with a fungicide budbreak to shell hardening.
Table 2. Partial listing of EPA-registered fungicides for pecans which are NOT “restricted use” and carry the signal word ‘Caution’. **Trade names are presented for reference only and do not imply product endorsement.** Product cost varies by location, dealership, availability of generic products etc.

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Trade Name(s)</th>
<th>Mode of Action</th>
<th>Rate per acre/approx. (rate per gallon)*</th>
<th>Minimum quantity packaging**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azoxystrobin</td>
<td>Abound</td>
<td>Quinine outside inhibitor (QOI)</td>
<td>9-12 oz/A (3/4 tsp/Gal)</td>
<td>One gallon, approximate cost $250</td>
</tr>
<tr>
<td>Fenbuconazole</td>
<td>Enable</td>
<td>Dimethylation inhibitor (DMI)</td>
<td>8 oz /A (1/2 tsp/Gal)</td>
<td>40 oz container, approximate cost $75.00</td>
</tr>
<tr>
<td>Propiconazole</td>
<td>Bumper, Orbit, Banner Maxx, Propimax</td>
<td>Dimethylation inhibitor (DMI)</td>
<td>4-6 oz/A (4/10 tsp/Gal)</td>
<td>One gallon, approximate cost $100-300.00</td>
</tr>
<tr>
<td>Thiophanate methyl</td>
<td>Topsin M 4.5 FL, Topsin M 70 WDG</td>
<td>benzimidazole</td>
<td>20 oz/A (1.2 tsp/Gal), 1 LB/A (1.5 tsp/Gal)</td>
<td>2.5 gallons approximate cost $179.00 2 lb bag</td>
</tr>
<tr>
<td>Pyraclostrobin and Boscalid</td>
<td>Pristine</td>
<td>Quinine outside inhibitor (QOI) and anilide</td>
<td>12-14.5 oz/A (1.25 tsp/Gal)</td>
<td>120 oz, approximate cost $375.00</td>
</tr>
<tr>
<td>Kresoxym-methyl</td>
<td>Sovran</td>
<td>Quinine outside inhibitor (QOI)</td>
<td>4.8 oz/A (1.4 grams/gal)</td>
<td>1.5 lb, approximate cost $89.00</td>
</tr>
<tr>
<td>Tebuconazole</td>
<td>Tebuzol 3.6F</td>
<td>Dimethylation inhibitor</td>
<td>4 to 8 oz/Acre</td>
<td>2.5 gallon approximate cost $150 to $200</td>
</tr>
</tbody>
</table>

*Refer to the product label for accurate rate, timing, # of applications, etc.
**Costs are ballpark approximations, which may vary widely across the country
Pecan Nut Casebearer

Attacks crop in late spring every year
Light crops at greatest risk
Insecticides must be well timed
Use pheremone traps
http://pncforecast.tamu.edu
http://pecan.ipmpipe.org
Insecticides: spinosad, Intrepid, Lorsban (restricted use)
malathion, sevin, Bt (marginally helpful)
Sticky honeydew from yellow aphid feeding

Unpleasant for cars, tolerable for trees

Yellow splotches from Black Pecan Aphid feeding
May cause severe defoliation which is bad for setting crops.

Aphids
Promote Beneficial Insects for biological aphid control
Imidacloprid Products

- Systemic properties, based on application method
- Targets Piercing, sucking insects
- Reduced impact to beneficial insects
- Some concerns with bee toxicity via flowers

Not a product endorsement
Neem-based Products

- Natural product derivatives
- OMRI/Organic approved
- Liminoid compound called azadirachtin
- Broadspectrum insect repellant or growth regulator
- Fungicidal properties
- OMRI/Organic approved

Not a product endorsement
Insufficient water in ON-Year only results in BAD OUTCOMES

Photo: Stein
Grapes

Slides provided by Fritz Westover
Pierce’s Disease

Symptoms

Pathogen

Vectors
Black Spanish “Lenoir”

Excellent for Port Style wines

• Dry table wine potential

• Very susceptible to Downy Mildew
Blanc Du Bois

- Premier white wine grape for Gulf Coast and Texas
- Mortensen Hybrid
- Muscat aromas, compared to Sauvignon Blanc
- High susceptibility to rots
Muscadines

*V. rotundifolia* (Michaux)

Photo credit: plants.usda.gov

Photo credit: C.W. Cook, Duke Univ.
Fungal Disease Pressure

Black Rot  Powdery Mildew  Downy Mildew
Grapevine Phenology

Eichorn-Lorenz Stages in Shoot Development in the Grapevine

**Dormancy:**
Lime Sulfur 5-10 gal/acre
(01-03)

**Young shoots 4-6 inches:**
Mancozeb

**Pre-Bloom/Bloom:**
Mancozeb + Mycobutanil + Bt, or Sevin or Spinosad
Grapevine Phenology

Bloom

'BB' to 'Pea size' berries
Mancozeb + Mycobutanil + Bt, or Sevin or Spinosad
Grapevine Phenology

Berry Touch or Cluster Closure
Captan
Grapevine Phenology

Beginning of berry ripening: beginning of loss of green color “veraison”
Captan

41 After harvest, end of wood maturation
43 Beginning of leaf fall
47 End of leaf fall