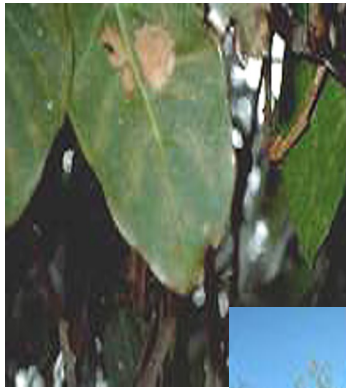


Drought Induced Orchard Problems



Or What Hath Drought Wrought?

Avocado Disease in California



- Minor Diseases (Unless they happen to be in your grove!)
- The Major Disease, Avocado Root Rot

Avocado Root Rot – shows thinning foliage (*Phytophthora cinnamomi*)



- Most serious avocado disease in California
- Thrives on excess soil moisture and poor drainage
- Symptoms: leaves are small, pale green, wilted, can see the sky through the tree
- Control irrigation, rootstocks, gypsum. mounding, phosphonates
- AND MULCH

Roots one year after phos acid injection



Phosphorous Acid

- Registered in California as a fertilizer
- Often confused with phosphoric acid, also registered as a fertilizer but this has no activity as an anti-fungal chemical
- Stimulates a defense response in the tree, e.g. tree produces it's own anti-fungal chemicals in response to the injection of phos acid
- Possibly stimulates the salicylic acid pathway
- All brands on the market work equally well



Decomposition by fungi leads to competition with *Phytophthora*, and reduction in inoculum
Botryosphaeria fungi are important decomposers saprophytes



Conserves water
Modifies temperature
Controls weeds
Adds nutrients
Controls snails
Affects ant population
Stops rain splash



Citricola

Canker

Phytophthora mengei

Disease – water hitting trunks

Pathogenic and treatable
with phosphonates



Where water accumulates
Even if it is high DU,
if it hits the trunk, you are
sunk.



Avocado Phytophthora Fruit Rot



- Cause: fungus *Phytophthora mengeii*, the same fungus that causes trunk canker
- Minor disease, brought on by prolonged moist weather
- Responds to phosphonates

Dothiorella Fruit Rot



- Caused by same fungus as Dothiorella trunk canker
- Disease does not appear on the tree, but develops in fruit after harvest
- Starts with small purple-brown spots

Drought/salt damage leads to:

toxicity

deficiency

disease

death

pests

heat stress

tree growth

Often difficult to
distinguish amongst
them



wilting



asphyxiation



root rot

Common Water Problems



tip burn



leaf loss



sunburn

Most Obvious Problems



leaf drop/shriveled fruit

All fruit transpires
so they dry out like leaves

If you see wilting in a tree, it is caused by:

a) Lack of water

b) Too much water

c) Root rot

d) Gophers

e) Possibly all of the above



endoxerosis



Rind stain

Sometimes damage is only in fruit

Sometimes it concentrates specific salts
B, Cl, and Na and not total salts (EC or TDS)



boron/chloride



sodium

Can lead to nutrient deficiencies



nitrogen

potassium



No amount of fertilizer is going to correct it because it takes water to move nutrient into plant

Water-stress diseases
Non-pathogenic



Black streak



Bacterial canker



Botryosphaeria
(Dothiorella)
canker

Avocado Black Streak



- All Guatemalan varieties are susceptible (Hass, Reed, Nabal)
- Only found in California
- Symptoms: canker exuding white powder (sugar) on trunk and main branches

Avocado Bacterial Canker

Xanthomonas campestris



Water/Salt related stress

Can often be corrected by
simply correcting irrigation
distribution

Pocket of fluid builds up under
the white exudate. When dried
up there is a little flap of bark
left.

Dothiorella Stem and Leaf Blight **“Salt & Pepper Syndrome”**



Indicates underwatering
Symptoms show up a few
days after a heat spell

Can kill young trees

Cut out dead material, into
fresh green wood.

Dothiorella



- Cause: fungus *Dothiorella gregaria*, same fungus that causes fruit rot
- Symptoms: white powder that exudes from the bark and cracking and shedding of the outer bark
- Symptoms disappear after problem corrected



Leaf blight



Stem blight



Bot gummosis

More water stress

Botryosphaeria

When it goes to the fruit, its really a problem



Botryosphaeria that has gone from leaves to fruit



Decomposition by fungi leads to competition with Phytophthora, and reduction in inoculum

Botryosphaeria fungi are important decomposers - saprophytes looking for water stressed plants

A non-pathogenic disease:

a) Can kill a plant

b) Is nothing to worry about

c) Is an indication that something
that needs to be corrected

d) A and C

Mulch is a (mark all that apply):

a)Source of nutrients

b)Source of disease

c)Source of disease control

d)Water conservation measure

e)Requirement for plants

Pests



UC Statewide IPM Program
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Citrus red mite



UC Statewide IPM Project
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Persea mite

But!!!!



ACP

Many Pests are looking for
water-stressed trees.



Polyphagous Shot Hole Borer??????????

Most borers are looking for water stressed trees



Fusarium Dieback
Pest/Disease Complex
Slow dieback of canopy
Localized to S. CA and Israel



shot hole borer

Water and salt stress lead to:
smaller trees
smaller yields
smaller fruit



So what do you do about water and salt stress?

Fix the irrigation system

Apply water uniformly

Adjust irrigation – schedule according to tree need

Apply a leaching fraction

EC meters

\$50



\$250



With inadequate water

The next step



The Ultimate Solution

\$\$\$\$\$\$\$\$\$\$\$\$
\$
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Take home lesson:
You can't buy anything to
Correct a salt problem
Other than water and good
Management

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Salt damage (mark all that apply):

a) Indicates an excess of salt in the soil

b) Leads to poor nutrition

c) Indicates poor irrigation

d) Can lead to disease

e) Could mean too many nutrients

Under irrigation can lead to:

a) Water savings and greater income

b) More resilient trees

c) Deeper rooting

d) Less sunburn

e) Possibly more disease

Topics in Subtropics Newsletter:

<http://ceventura.ucanr.edu/newsletterfiles/newsletter653.htm>

Topics in Subtropics Blog:

<http://ucanr.edu/blogs/Topics/>



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News from the Subtropical Tree Crop Farm Advisors in California