

Drought/Heat/Salt Induced Orchard Problems



Or What Hath Drought Wrought?

Drought/Heat/Salt stress leads to:

toxicity

deficiency

disease

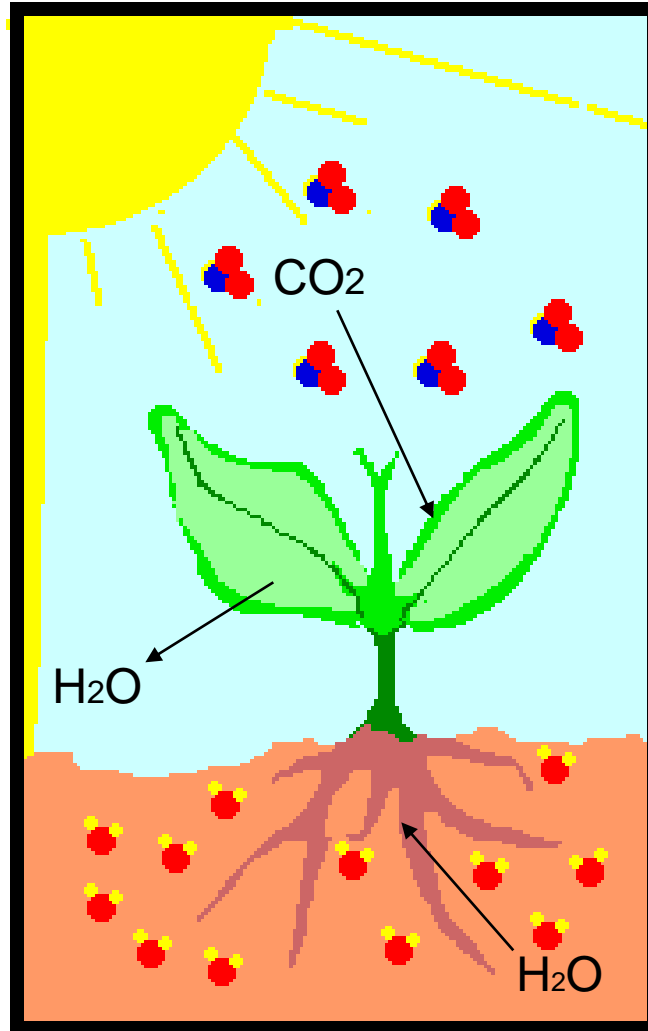
death

pests

heat stress

tree growth

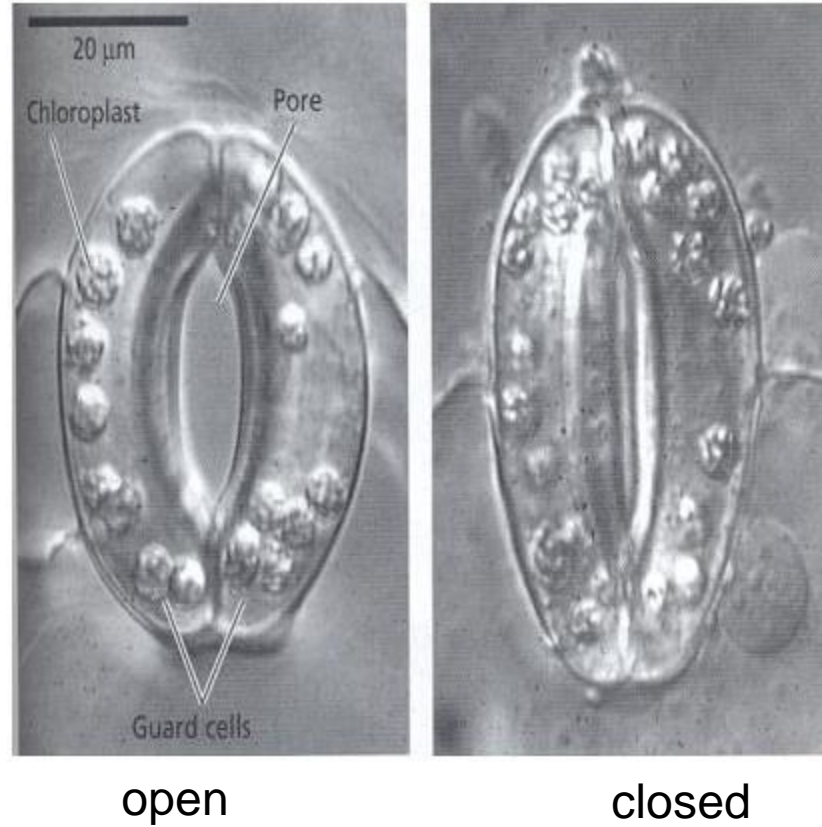
Often difficult to
distinguish between
the three



A plant must
lose water
in order to
grow

When stomata close, they stop growing.....
smaller fruit

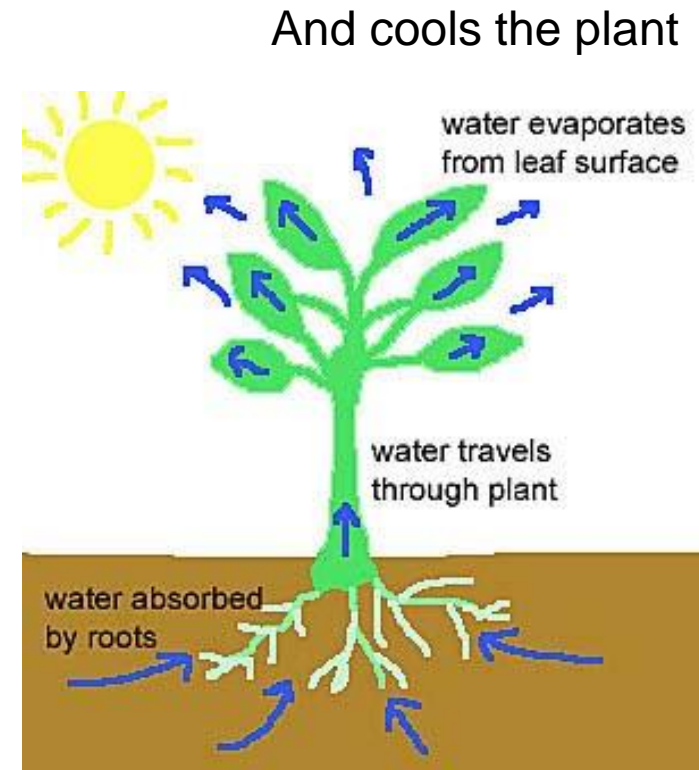
Stomata- openings on leaves



They close with insufficient light, high temperature and high evaporative demand

The stomata must be open for transpiration to occur
Otherwise the plant heats up, and sunburn occurs.

RADIATIVE COOLING



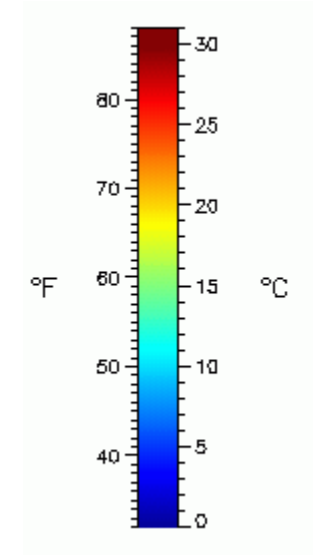
Evapotranspiration is driven by:

Sun – day length, clouds

Wind

Humidity

Temperature



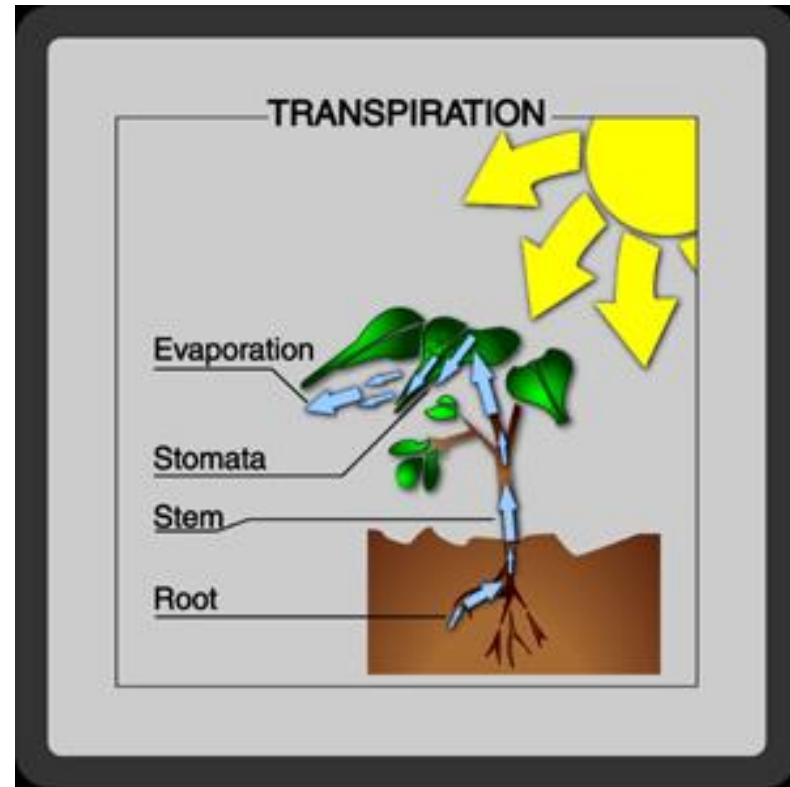
Santa Ana Winds are Water Suckers



Stomata close under:

- Light stress – low intensity, shaded
- Water Stress – droughty, wind winds
- Heat Stress - >85 deg F

Tree needs to be hydrated prior to heat in order to keep stomata open
Water stressed tree cant respond to heat
Heat stressed plants cant respond to water demand





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



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



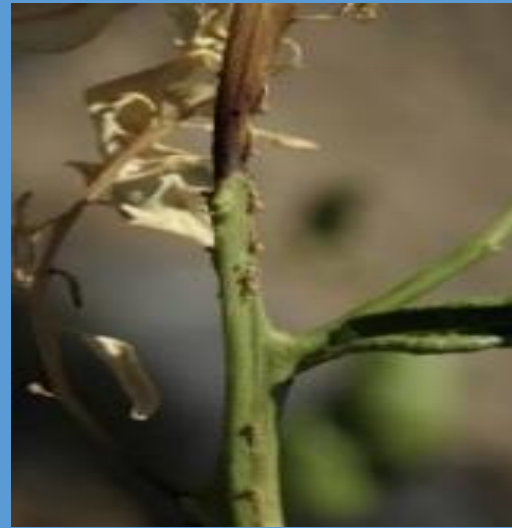
Bacterial canker



Dothiorella
canker



Leaf blight



Stem blight



Leaf clearing
'Star Ruby'



Bot gummosis

More water stress

When it goes to the fruit, its really a problem



Botryosphaeria that has gone from leaves to fruit



Citricola

Canker

Phytophthora mengei

Disease – water hitting trunks

Pathogenic and treatable
with phosphonates

Pests



Citrus red mite



Persea mite

But!!!!



ACP

Many Pests are looking for
water-stressed trees.



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

Most borers are looking for water stressed trees

Heat –stressed misshapen fruit
Often on south side of tree



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

Ojai, CA since 2019



Tree needs to be hydrated prior to heat in order to keep stomata open

Water stressed tree cant respond to heat

Heat stressed plants cant respond to water demand

Heat Stress vs Water Stress

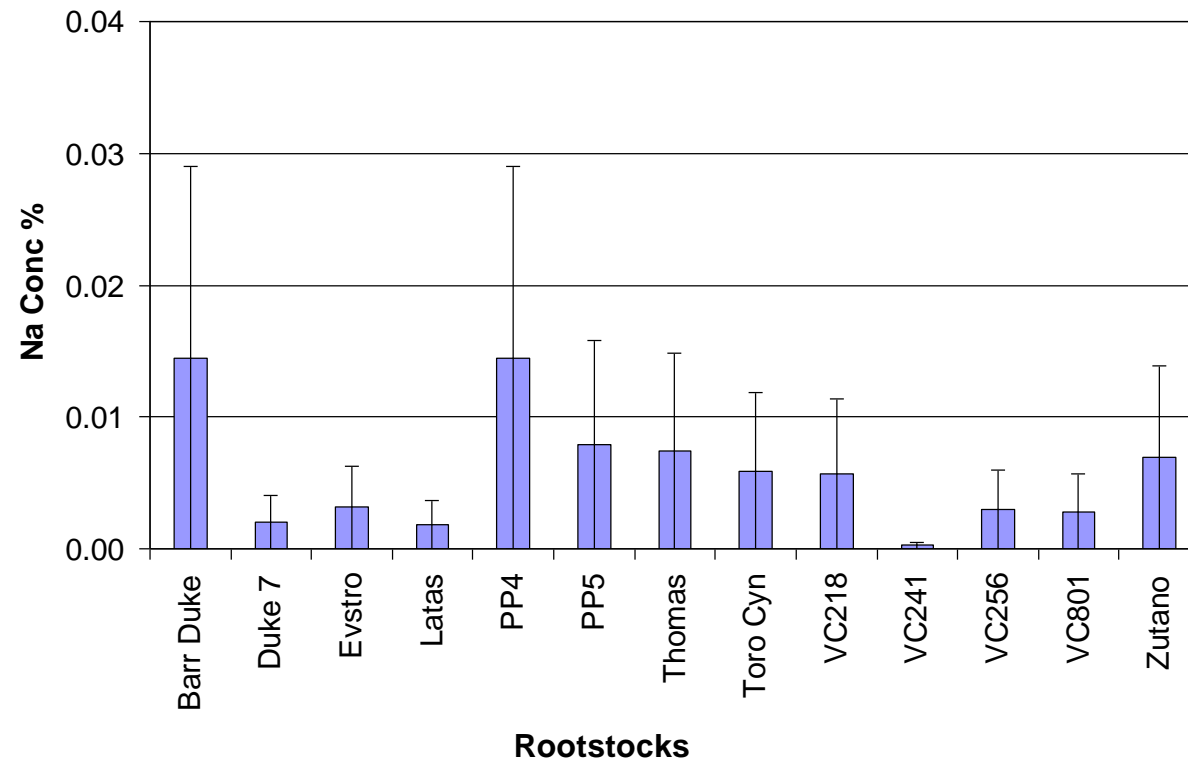
- Sunscreen - Surround, Screen Duo, etc. – reflect heat/light
- Vaporguard / Envy / Wilt Not/Antistress – reduce water loss ????????
- White Paint on trunks for sunburn protection





Sodium concentrations in avocado leaves

Stehly Ranch, Sept. 2002



There is some variability in resistance/tolerance to drought/heat and salt

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Take home lesson:

It's hard to buy anything to
correct these problems

Other than water and good
Management

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Questions?

Topics in Subtropics Newsletter:

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

Topics in Subtropics Blog:

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

