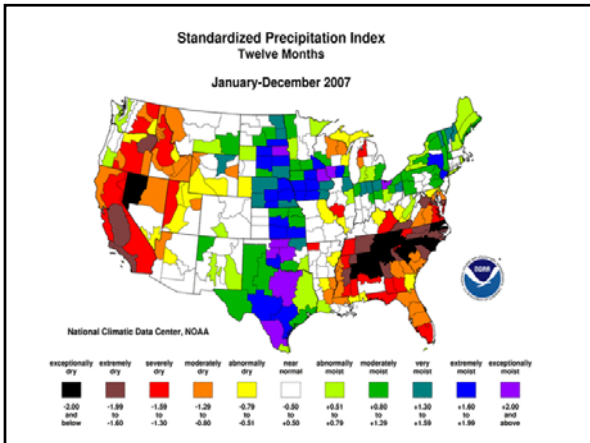
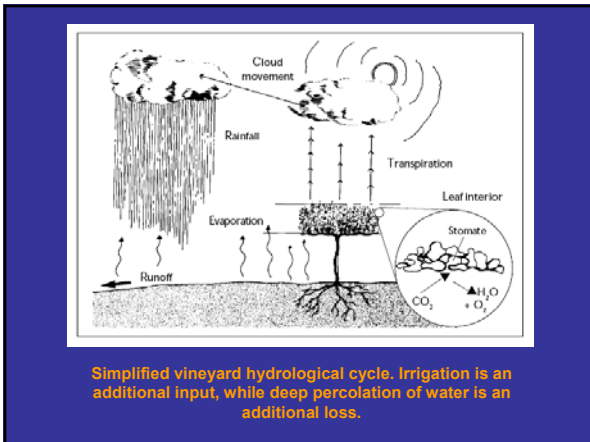


Vineyard Irrigation: Considerations for predicting irrigation needs in Virginia vineyards

Tony K. Wolf
10 February 2008
Virginia Vineyards Association







Risk of drought stress

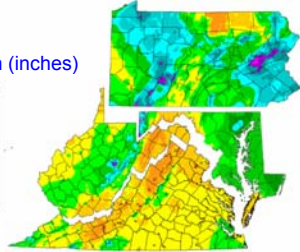
- Macro-climate
- Nature of summer rainfall
- Cyclical nature of climate/drought frequency
- Site-specific considerations
 - Soils
 - Vineyard floor management and weed competition
 - Rootstock
 - Cropping, training and other cultural practices

Macro-climate

Macroclimate considerations – some parts of Virginia are wetter/drier than other parts – northern Shenandoah Valley is particularly dry.

- This is a crude comparison and does not indicate the seasonal nature of rainfall.

Mean annual precipitation (inches)



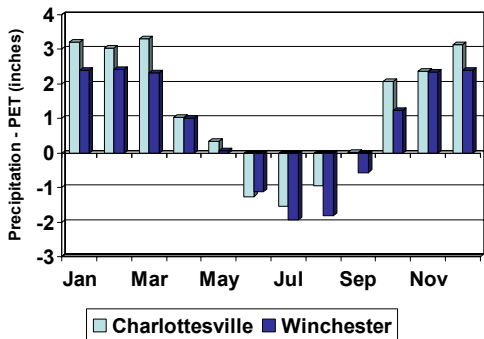
Risk of drought stress

- Macro-climate
- Nature of summer rainfall



Photo credit: Weather Underground

Average imbalance between precipitation and potential evapotranspiration for two Virginia locations (20-year average).

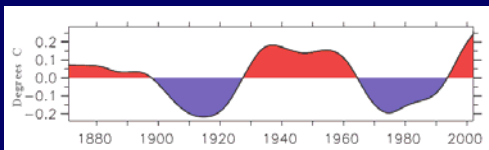


Risk of drought stress

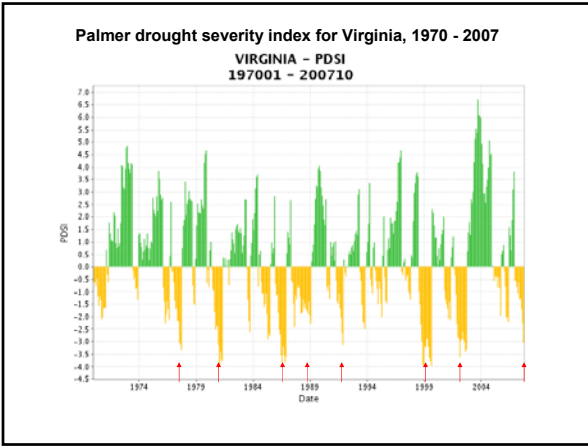
- Macro-climate
- Nature of summer rainfall
- Cyclical nature of climate/drought frequency

Risk of drought stress

- Macro-climate Atlantic multidecadal Oscillation



Cycles of long-term drought and wet spells in US regions appear to correlate to cycles of increasing or decreasing ocean temperature, such as the AMO (Atlantic Multidecadal Oscillation) and the PDO (Pacific Decadal Oscillation).



Risk of drought stress

- Macro-climate
- Nature of summer rainfall
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 - Soils

Soils

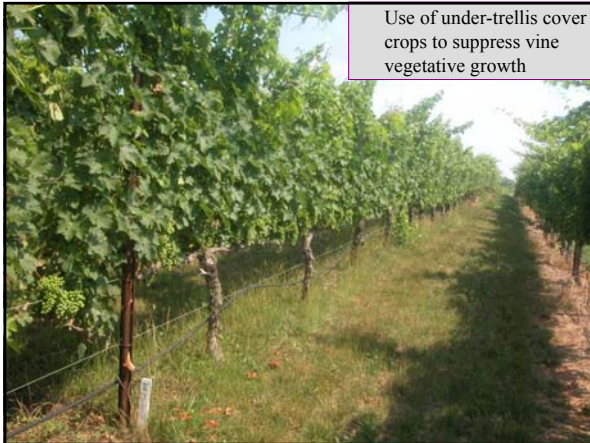
- Soil depth
- Rooting depth of vines
- Soil water holding capacity
- Function of depth and texture

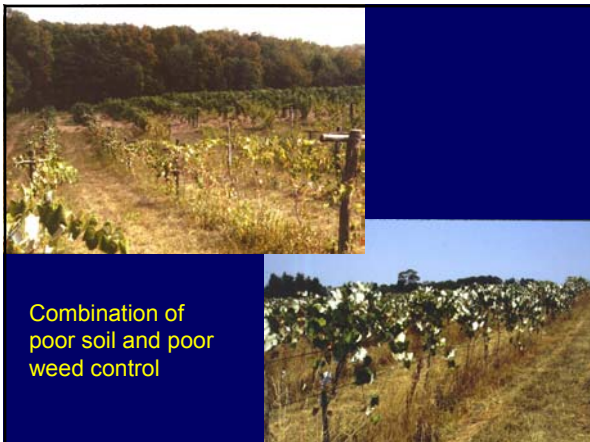
The diagram illustrates the process of soil water dynamics. It shows three stages of soil moisture: 1. Saturated soil: all pores are filled. 2. Field capacity: about 1% of pores are filled. 3. Wilting point: plants can't extract the remaining water. Processes shown include Rain, Infiltration, Drainage, Evaporation, and Transpiration.

Plant Available Water (PAW) is the amount of soil moisture between Field Capacity (FC) and Permanent Wilting Point (PWP).

Risk of drought stress

- Macro-climate
- Nature of summer rainfall
- Cyclical nature of climate/drought frequency
- **Site-specific considerations**
 - Soils
 - **Vineyard floor management and weed competition**





Risk of drought stress

- Site-specific considerations
 - Soils
 - Vineyard floor management and weed competition
 - Rootstock

Drought-susceptible	Drought-tolerant
420-A	140 Ruggari
C-3309	110 Richter
1616-C	1103 Paulsen
101-14 Mgt	
riparia Gloire	
SO-4	

Risk of drought stress

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Heavily-cropped Sangiovese at Winchester AREC, 1991 (dry year)

Questions?
