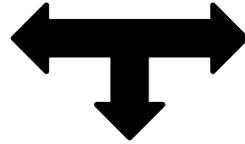


**WIV 20
23**

WIV 2023

- Technology for Precise Water Management
- Loni Lyttle
- Advanced Viticulture

What makes us Advanced Viticulture?



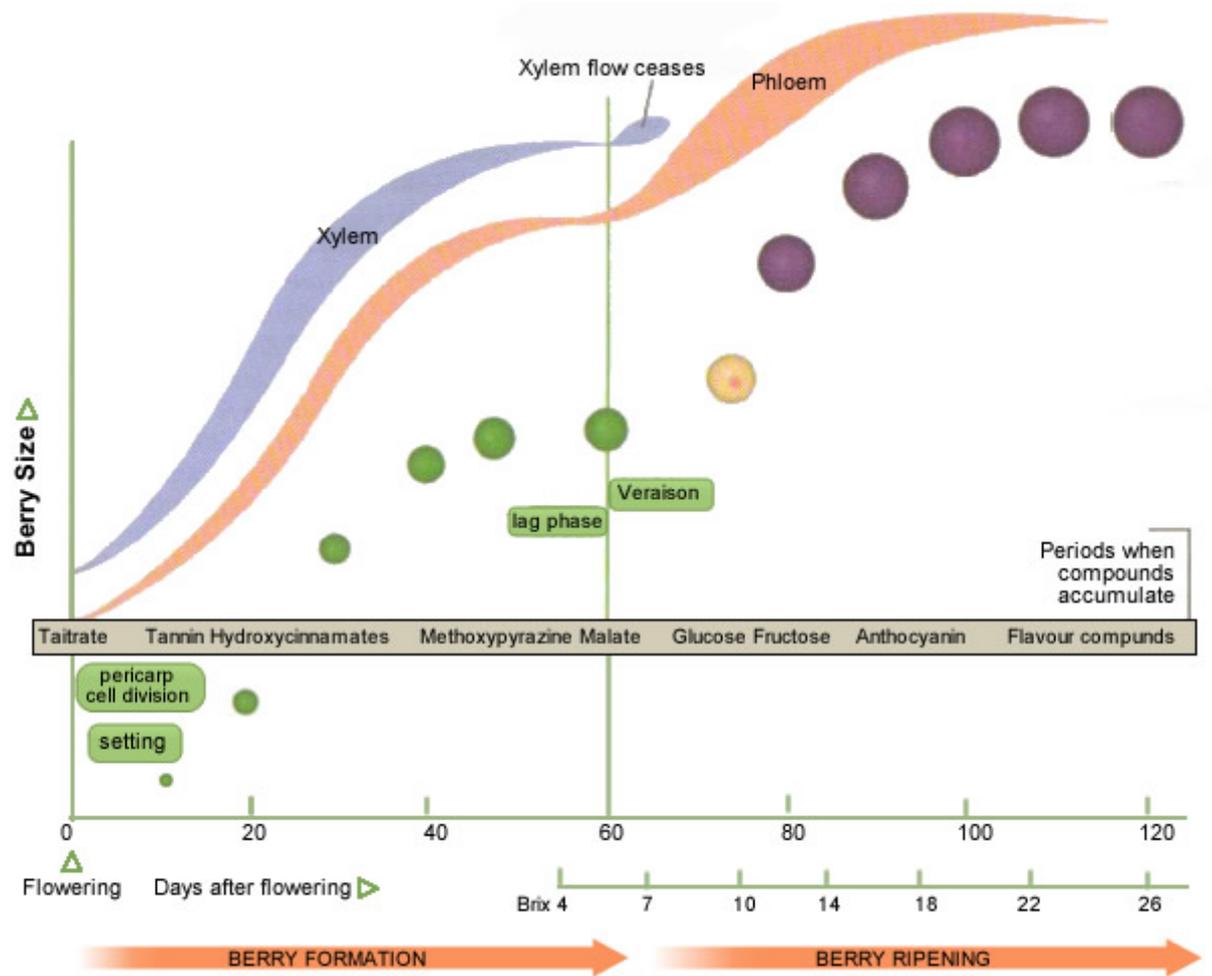
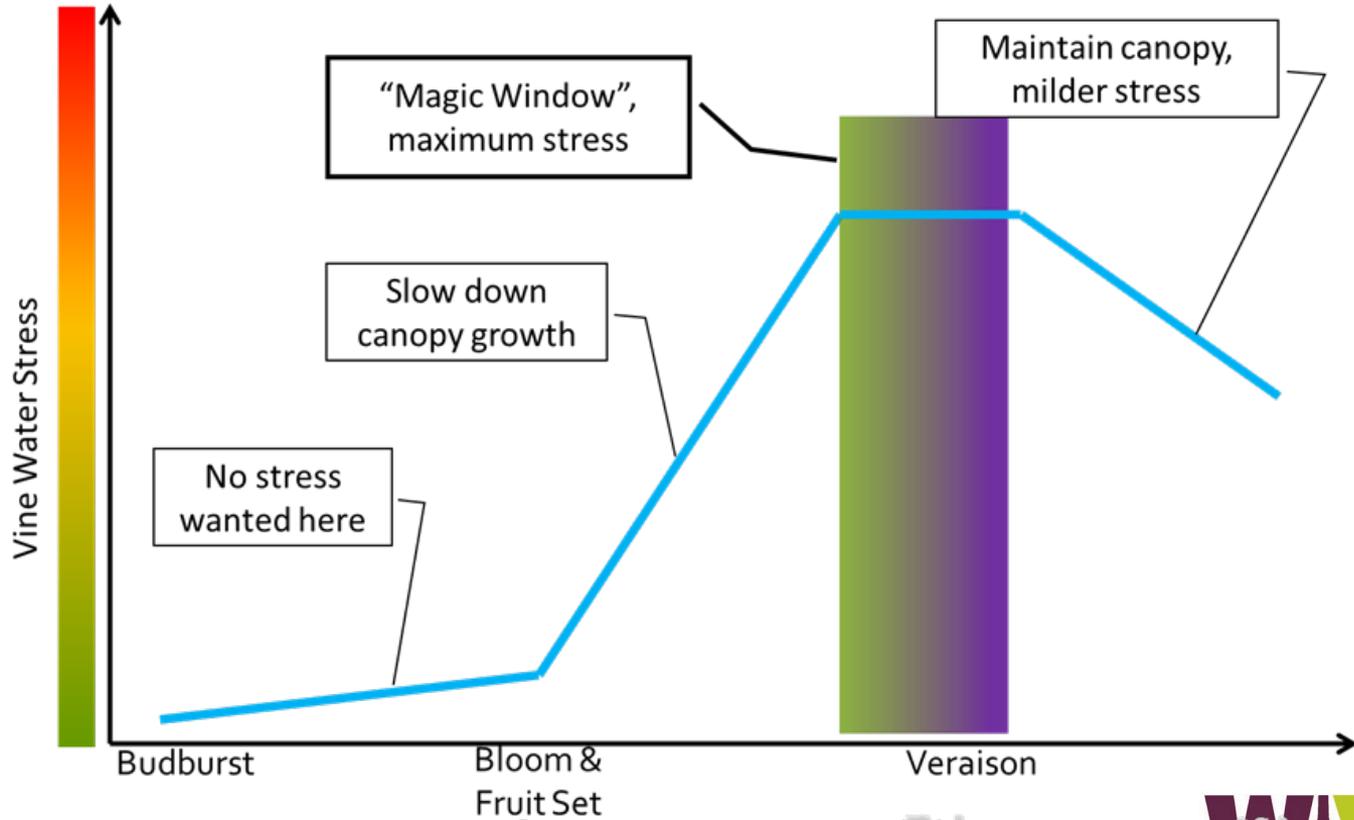


Figure 1. Grape berry development (taken from Keller 2010, who reproduced from Coombe 2001).

Vine Water Stress Management



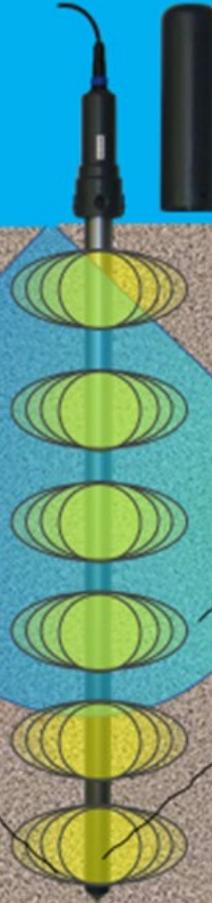
Where am I?



?

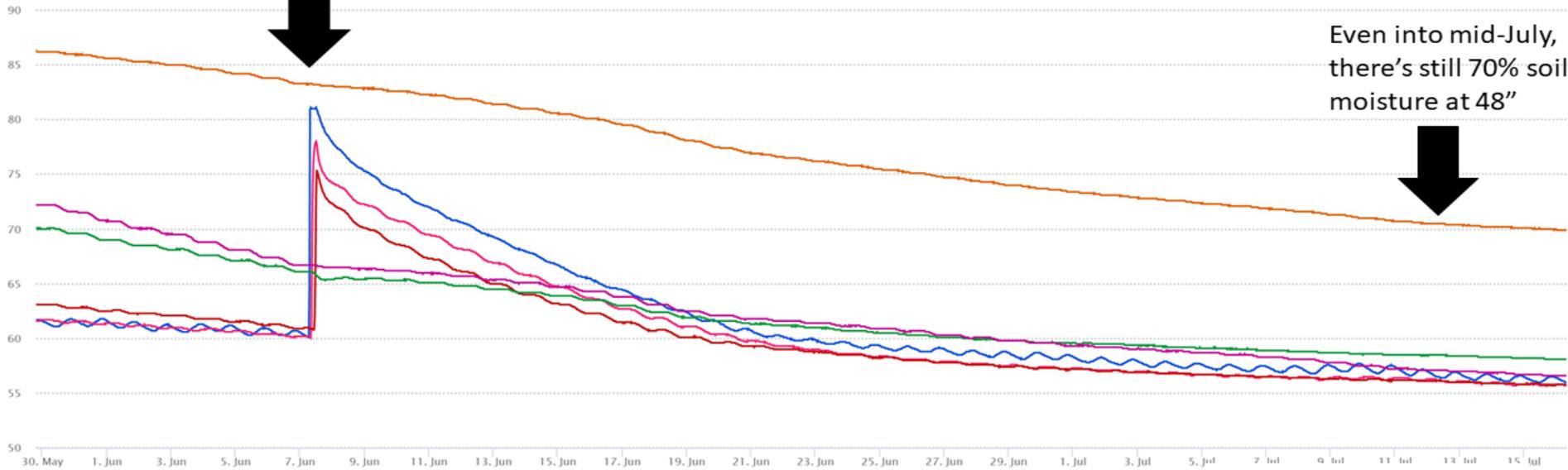


Permittivity of water is about 80x that of air



Permittivity is akin to dielectric constant, which influences capacitance

Uptake slowed in the first 24" of soil, but there was still active uptake in the deeper soil, which is still moist.



Even into mid-July, there's still 70% soil moisture at 48"

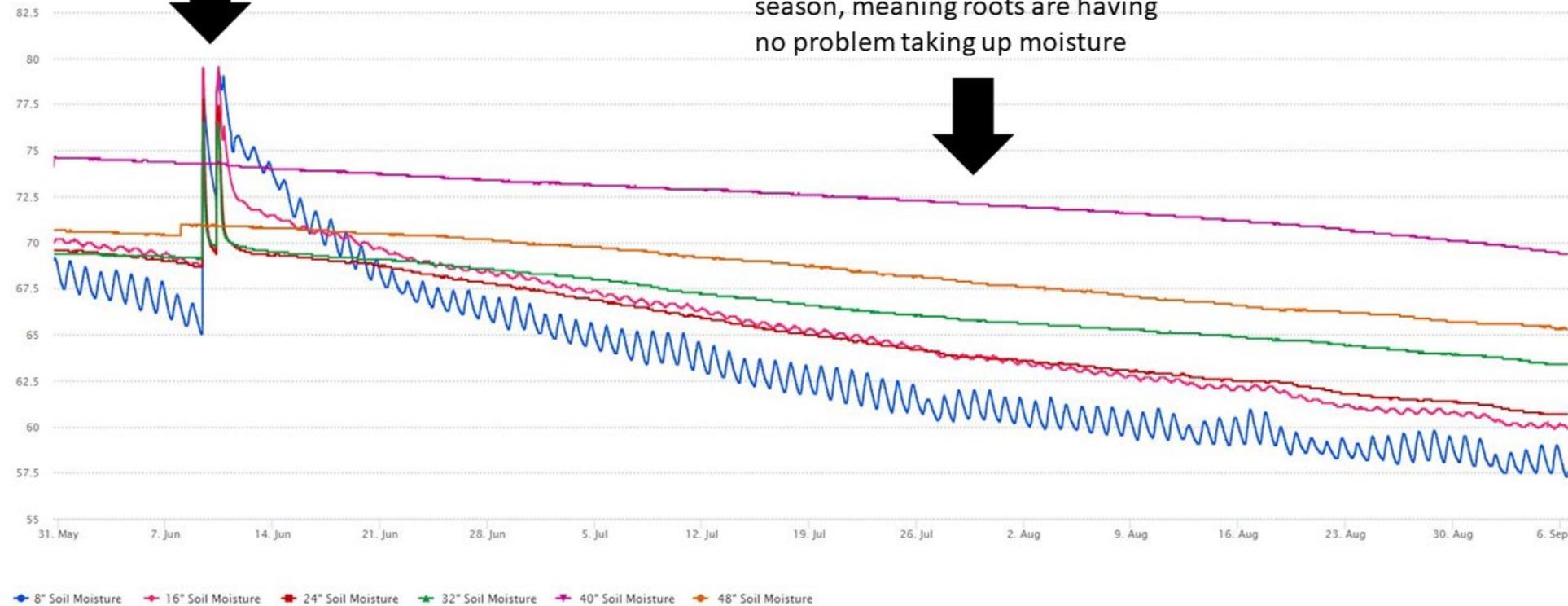


8" Soil Moisture 16" Soil Moisture 24" Soil Moisture 32" Soil Moisture 40" Soil Moisture 48" Soil Moisture

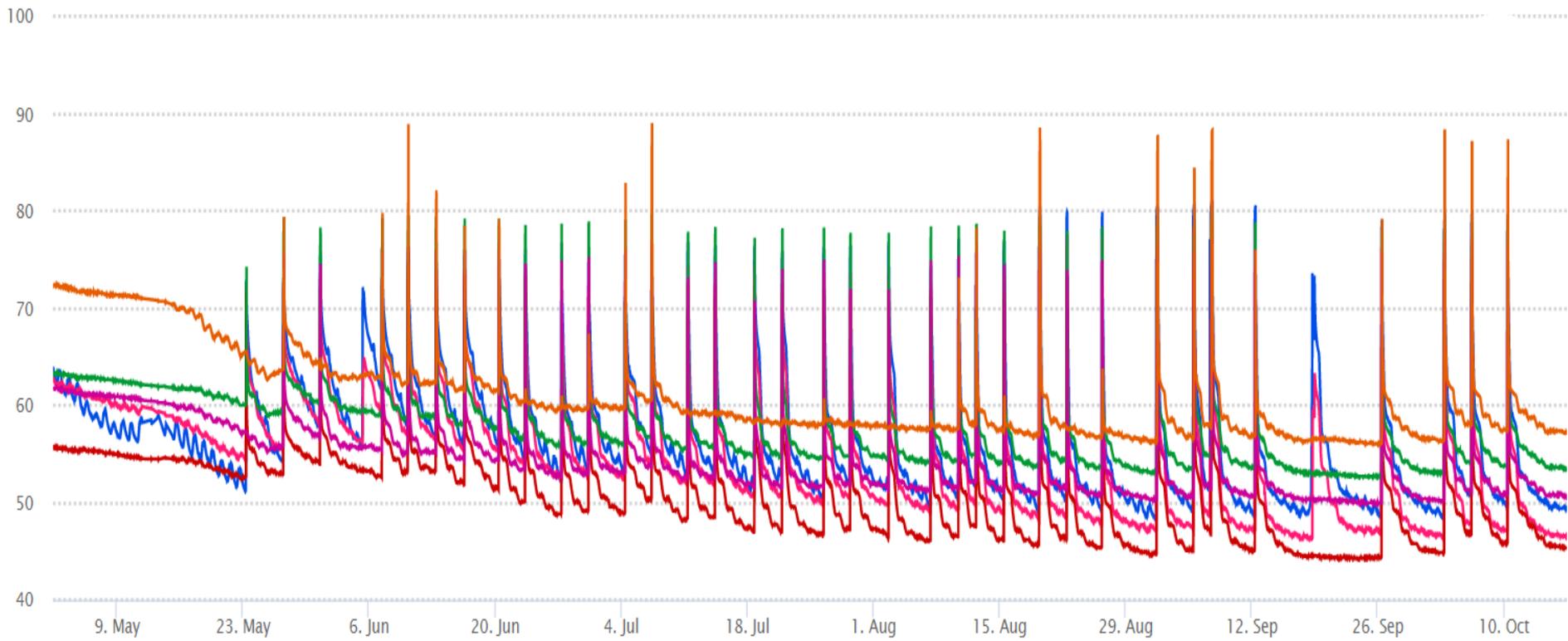
There was one
fertigation in June



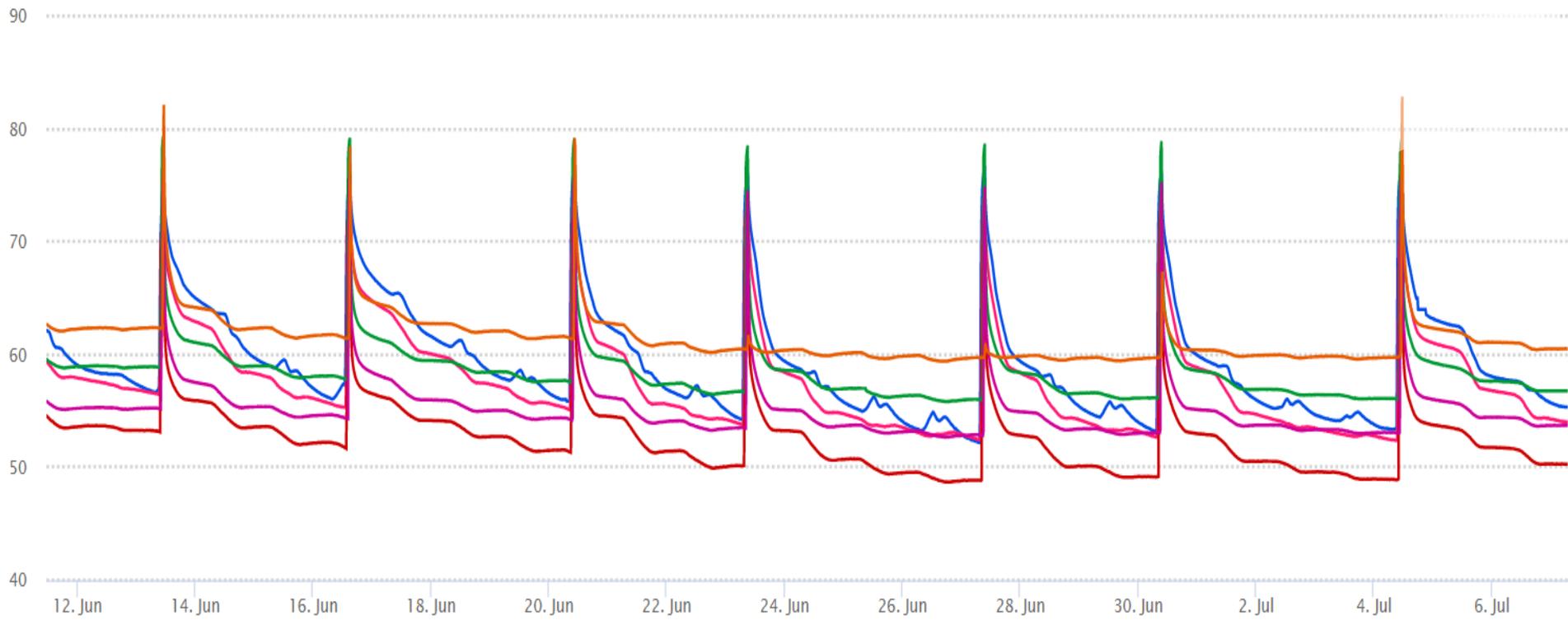
Uptake has been linear the entire
season, meaning roots are having
no problem taking up moisture



8" Soil Moisture 16" Soil Moisture 24" Soil Moisture 32" Soil Moisture 40" Soil Moisture 48" Soil Moisture



4" Soil Moisture 8" Soil Moisture 16" Soil Moisture 24" Soil Moisture 32" Soil Moisture 40" Soil Moisture



4" Soil Moisture 8" Soil Moisture 16" Soil Moisture 24" Soil Moisture 32" Soil Moisture 40" Soil Moisture



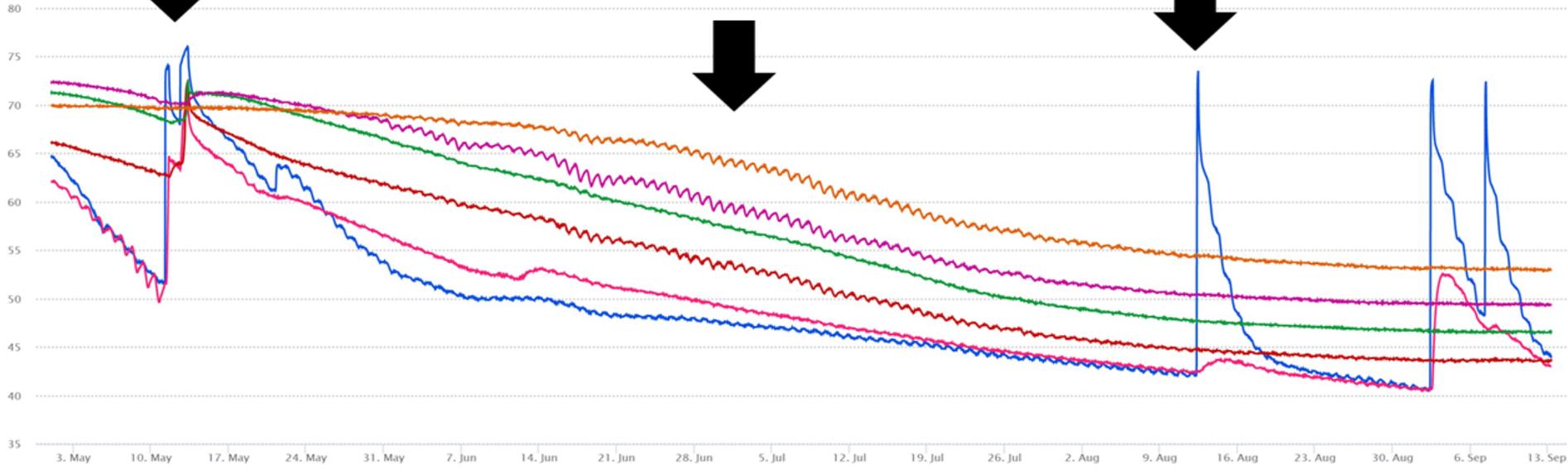
There was one irrigation in the early season to promote canopy development and set



Vines went without irrigation from mid-May to mid-August



When uptake starts flattening out, that means water is running out. Time to irrigate!



8" Soil Moisture 16" Soil Moisture 24" Soil Moisture 32" Soil Moisture 40" Soil Moisture 48" Soil Moisture



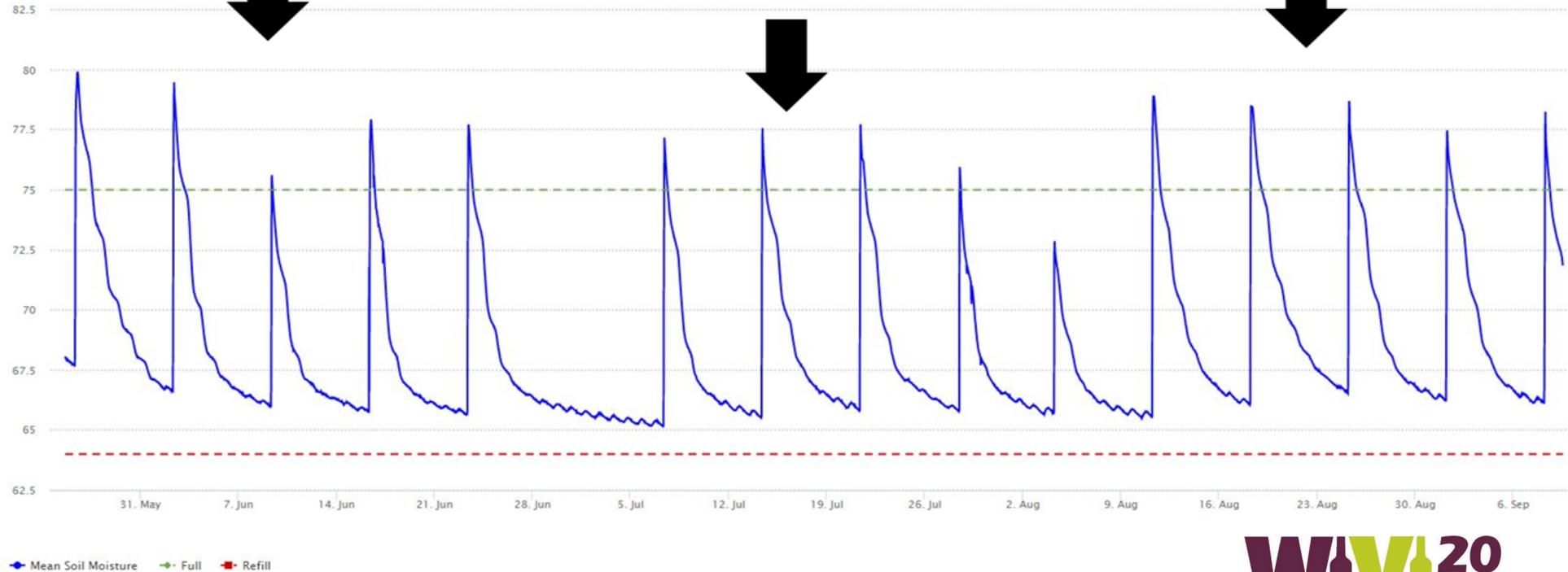
Vines start off well-watered in order to ensure early canopy development and fruit set...



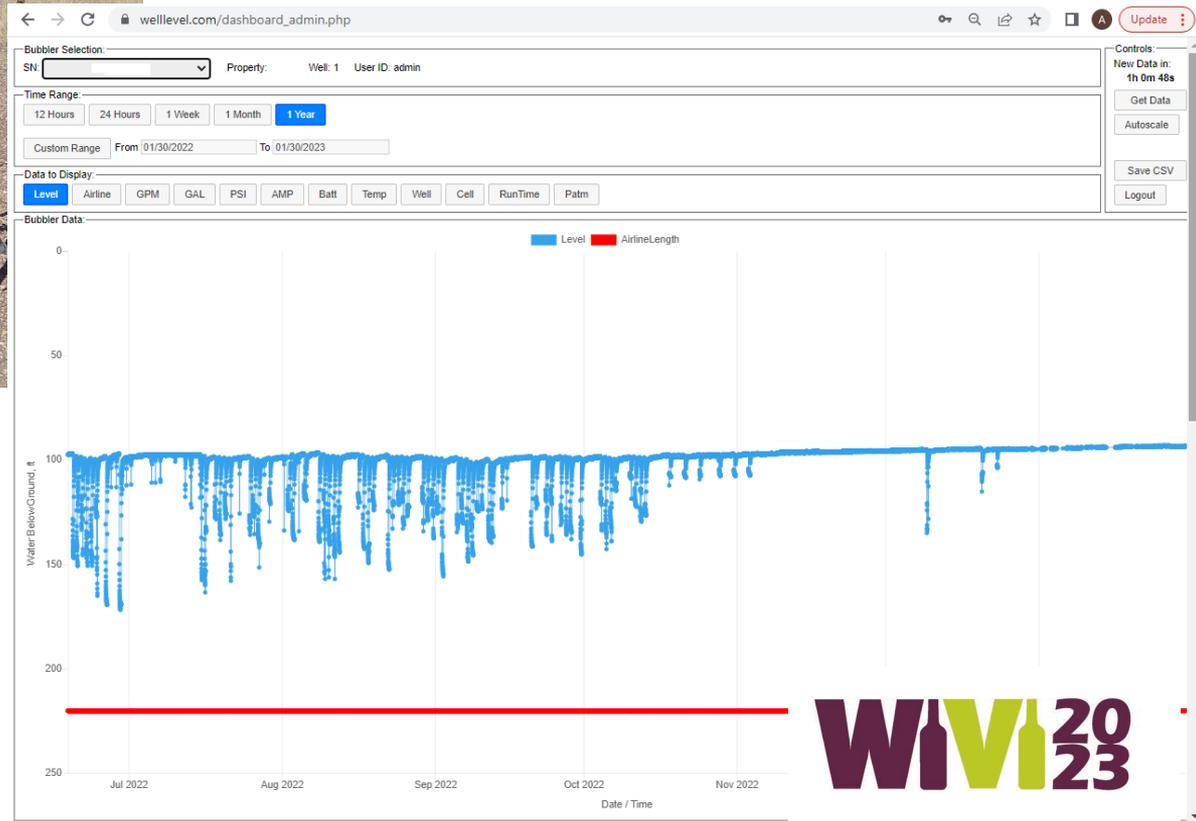
...During lag phase, vines are allowed to get stressed for phenolic development...



...After veraison is complete, vines are kept mildly stressed but otherwise allowed to recover



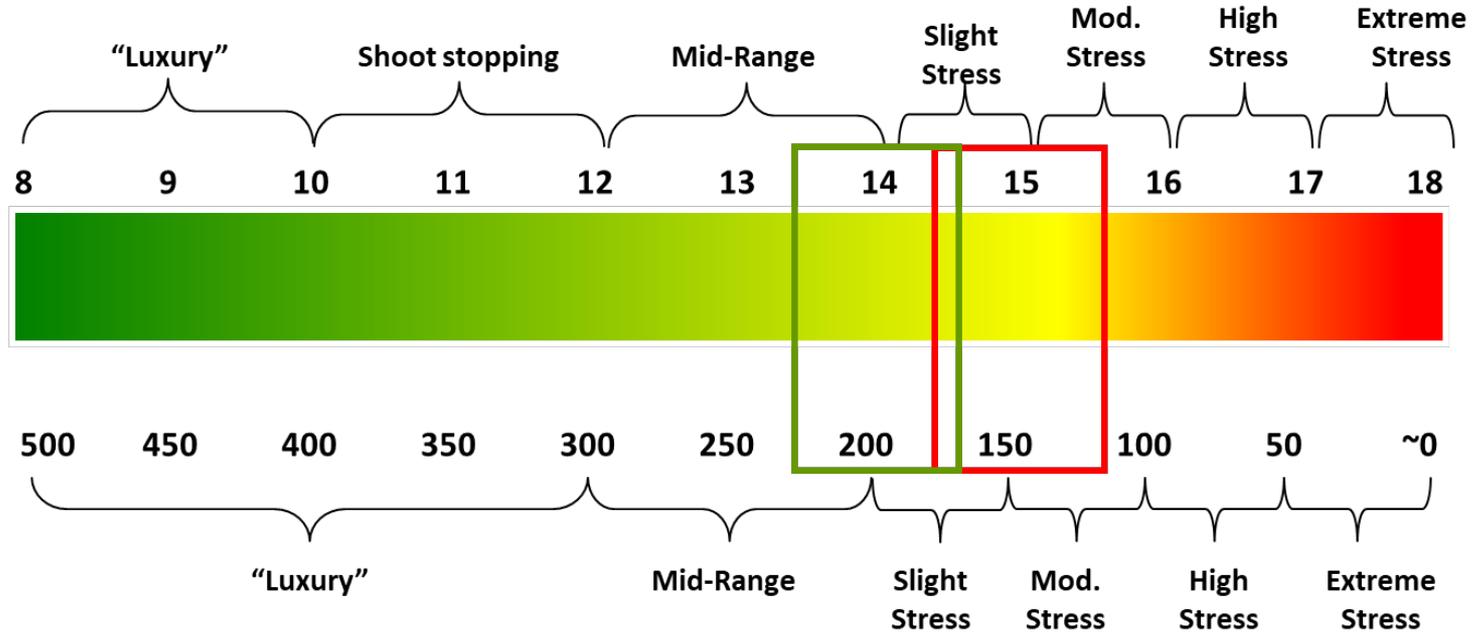
How much water do you have?



Soil moisture isn't plant stress...



Pressure Chamber/Leaf Water Potential (-bars)



Red target
White target

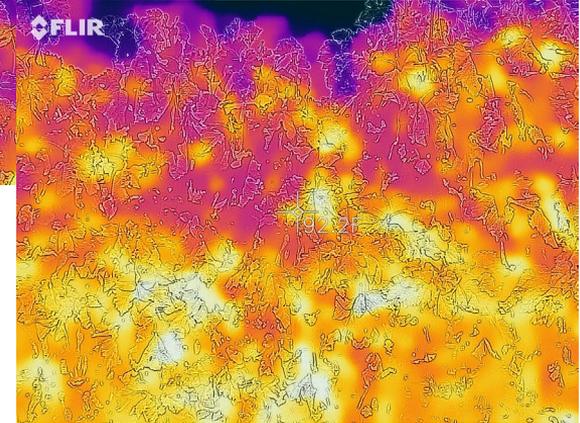
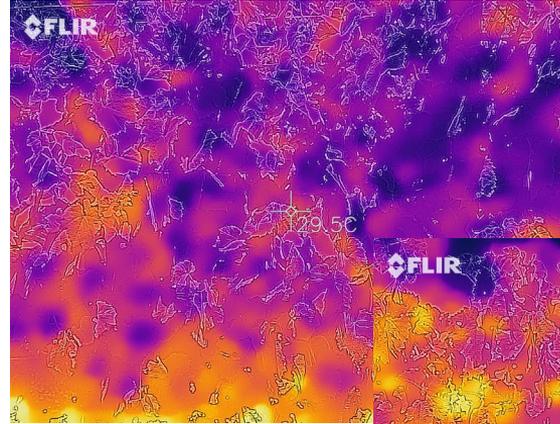


Porometer/Stomatal Conductance - Units are in $\text{mmol/m}^2/\text{s}$

Automated options

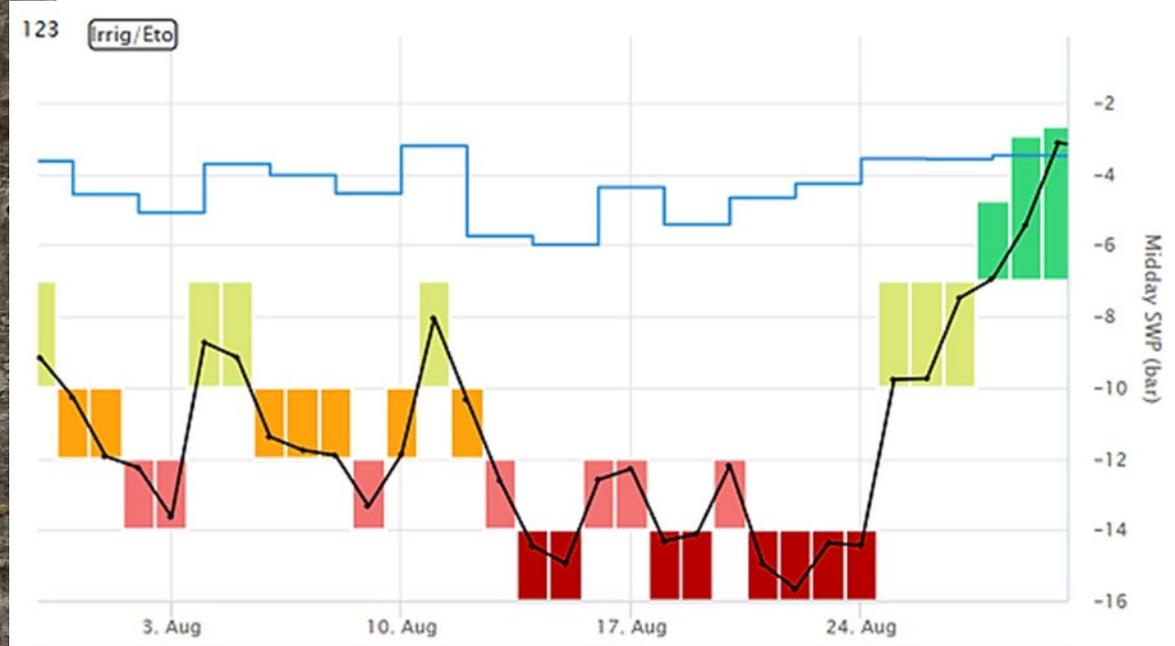


Athena IR-Tech

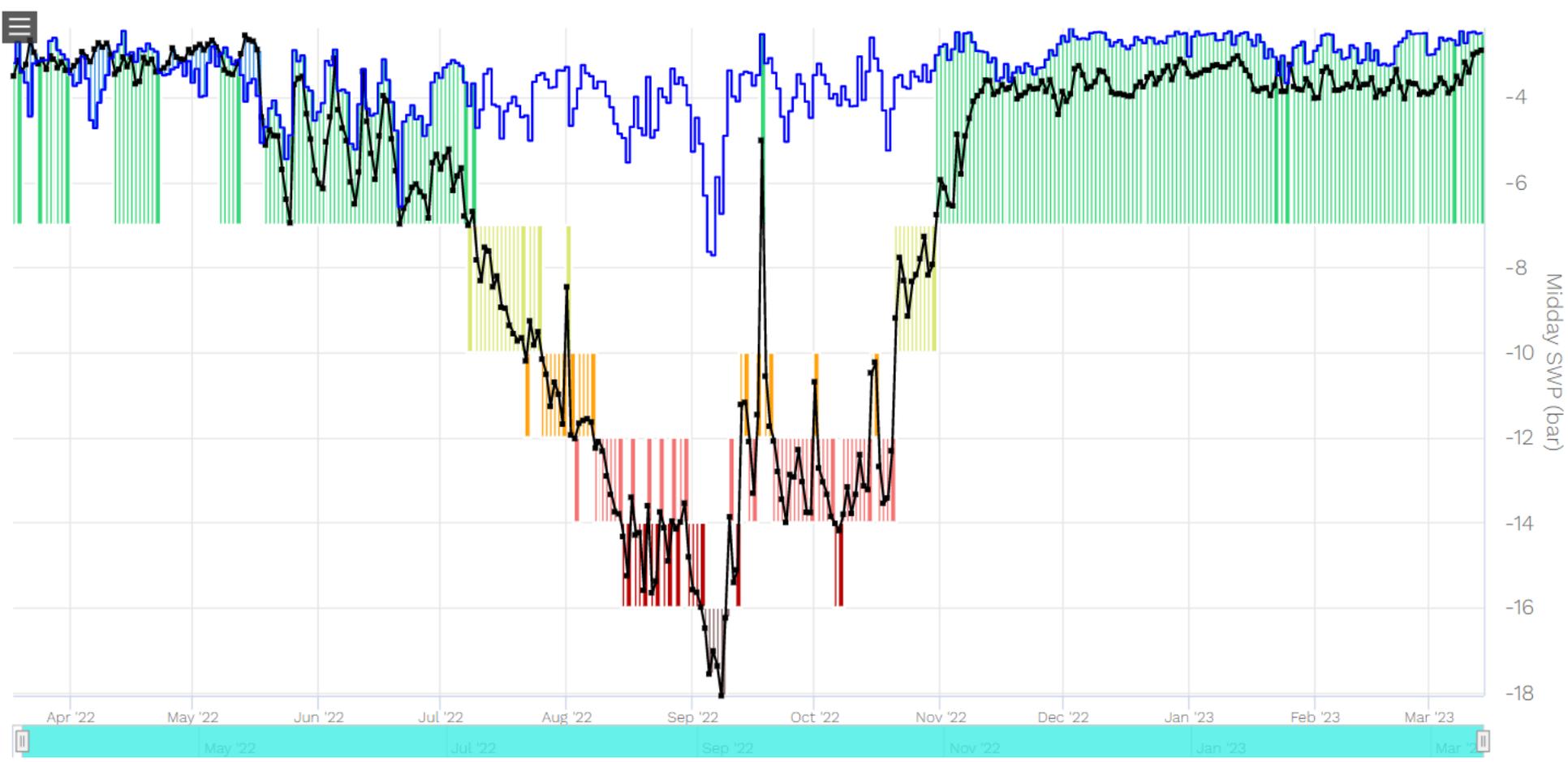




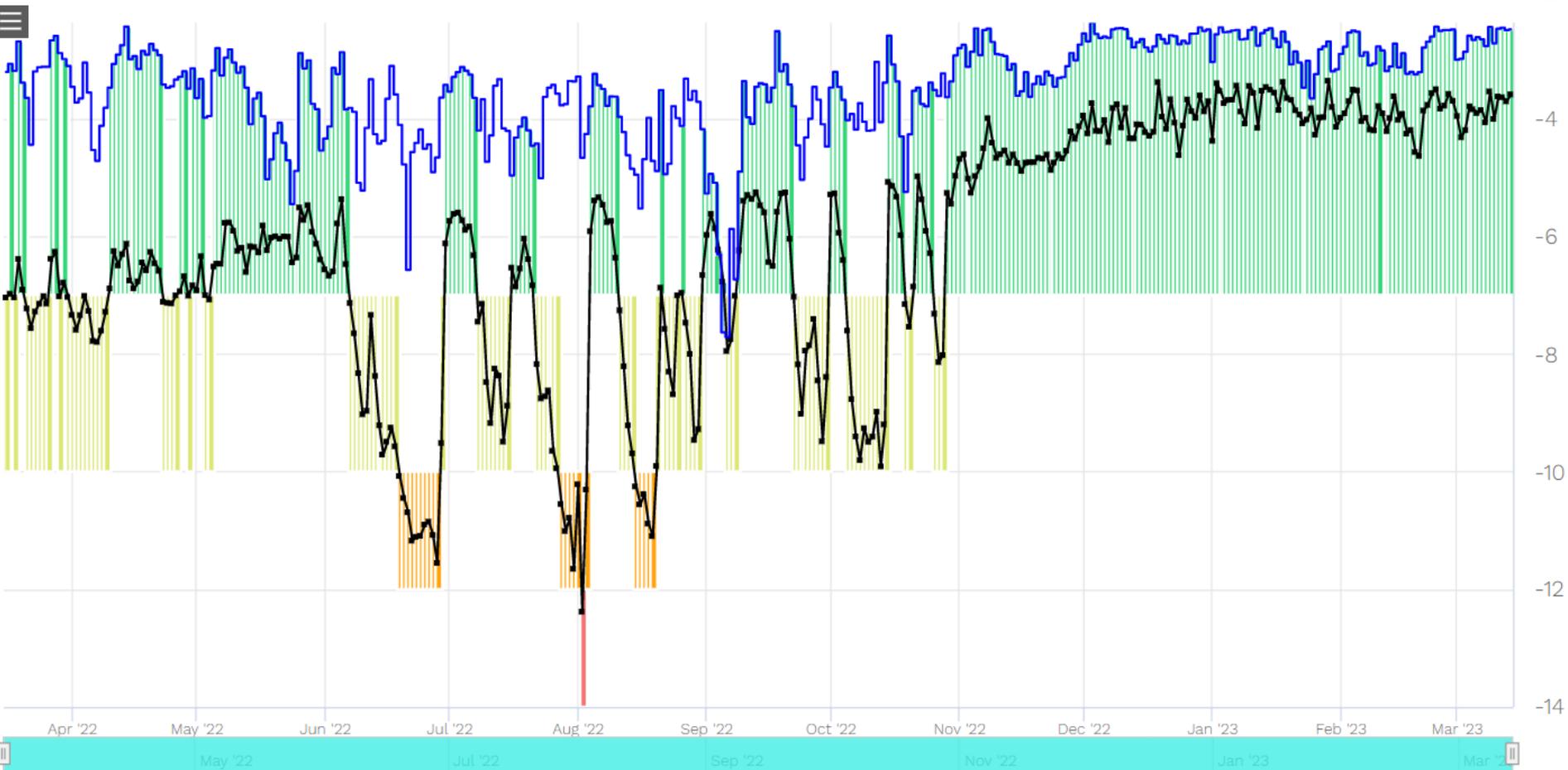
Florapulse microtensiometer



Midday SWP -



Midday SWP



Take away

- Managing stress is integral to growing high quality wine grapes.
- Knowing how much water you have (both in the soil and in the aquifer) helps you make season-long decisions.

Thank you

Loni Lyttle

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<https://advancedvit.com/blog/>

