Water Use Efficiency in Olives Super High Density (SHD)

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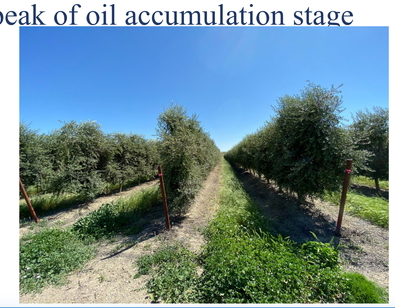
INTRODUCTION

- Orchards for olives has rapidly increased in California recent decades. This is partially due to the increased demand in olive oil and olive-based products in recent years. Leading to increased interest in tree/ fruit crops that can be grown on Class II soils, thus requiring less water. Orchards have transitioned to mechanization. The product produced in Northern California is similar to European products and at a cheaper price.
- Research has taken place in parts of Europe with a similar Mediterranean climate, areas such as Spain and Italy have ideal conditions. Research effort has been carried out in the last 10+ years to develop clear guidelines to manage and correctly water in SHD orchards. As a result, this practice is commonly accepted to maximize orchard performance. Irrigation should be applied in accordance with orchard water requirements,
- Plant physiology, water management, orchard management. Main goal is to see Super high-density olive orchards perform under optimal water use.

METHODS AND MATERIALS

- Four experimental blocks per treatment were selected and flagged in each orchard; each block was made of three consecutive rows, and the blocks were randomized along the orchard. All measurements will be done on three trees selected in the central row of the three blocks, and the other two rows will make as borders to ensure efficacy of the irrigation treatment.
- At pit-hardening (July) we implemented the deficit irrigation treatments, out of 4 treatments one was the control (no changes to the irrigation system), in one we reduced water application by 25% and in two treatments we reduced water application by 75%. One of the two 25% was restored to full irrigation during the peak of oil accumulation stage (September).



RESULTS

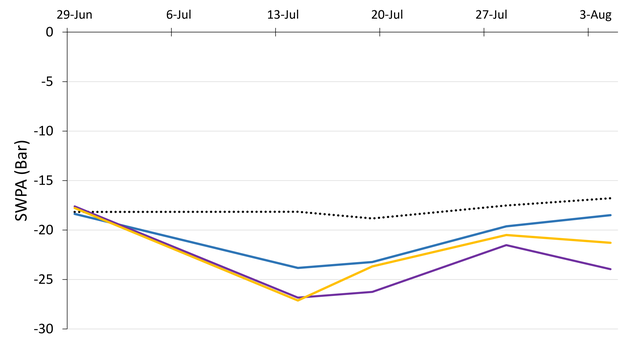


Figure 1: Line Graph: Date Stem water potential was taken compared to treatment.

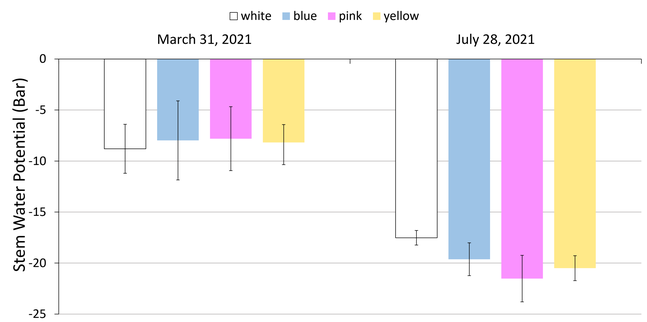


Figure 2: Comparing Baseline SWPA (March) to after deficit irrigation was applied.

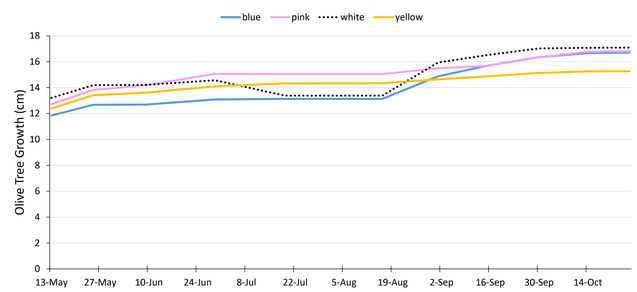


Figure 3: Line graph of New growth (NG) from mid May to mid October.

CONCLUSION

- SWP never decreased below the threshold values of -20 bars, which is when a significant reduction of photosynthesis and stomatal conductance would happen, based on data from literature. Also, we want to stress that this is a very peculiar year in term of water availability, due to the very dry winter and summer, and we are looking forward to comparing this with wetter years in the future.
- Yield must still be collected in order to see if the deficit irrigation had a true effect on the crop. Quantity and quality of the oil will be accounted for.

IMPLICATIONS

- This is a five year study with more data to be accumulated. In order to account for confounding variables at last one more year of data collection is needed.
- Furthermore depending on rainfall and intensity of the summer season will skew the data.

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