

# Water stress in Karst vineyards: results from 2018 and 2019 monitoring campaigns

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## CLIMATE CHANGE IS THREATING GRAPEVINES

Decreasing precipitation and increasing temperatures are forcing winemakers to implement irrigation systems to maintain wine production. In this light, adequate strategies to optimize water use while ensuring production of high-quality wines must be developed based on the response of grapevines to drought stress and the relationships between grapevine water status and berry and wine quality.

## RESEARCH QUESTION & RELEVANCE

**Which are the water stress levels typically experienced by grapevines in Karst?**

**Do differences in water stress levels correlate with grapes and Teran wine quality?**

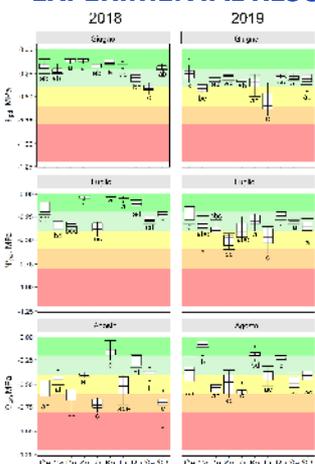
The determination of these correlations will help farmers to adopt adequate water irrigation strategies to optimize water use while maintaining production of high-quality Teran wine.

## EXPERIMENTAL APPROACH

- 10 vineyards (5 in Slovenia and 5 in Italy) monitored during growing seasons 2018 and 2019.
- Plant water status quantified in terms of pre-dawn water potential ( $\Psi_{pd}$ , proxy of soil moisture), and minimum water potential ( $\Psi_{min}$ , proxy of maximum water stress).
- Physical and chemical parameters of fully mature grapes: °Brix, pH, tartaric acid and malic acid content (g/L).
- Total polyphenols, high and low molecular weight proanthocyanidins (HMWP and LMWP), and total anthocyanins analysed in wine-like extracts, as well as mean degree of polymerisation (mDP), percentage of galloylation (G, %) and of prodelphinidines (P, %) separately in skins and seed wine-like extracts.



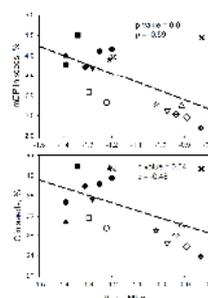
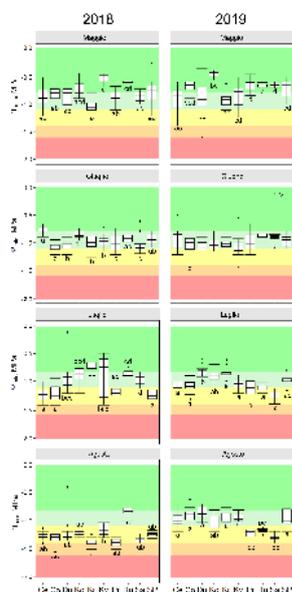
## EXPERIMENTAL RESULTS



Mild water stress during the two years. Lowest  $\Psi_{pd}$  and  $\Psi_{min}$  in August.

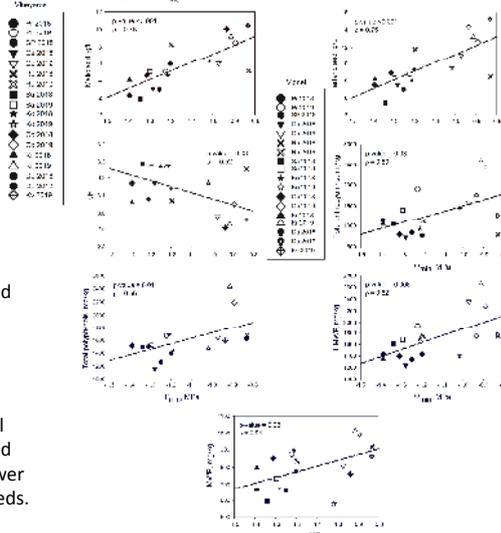
Vineyards never reached a critical water status (red area) and it was not necessary to irrigate.

Spatial heterogeneity of water stress, with marked differences during the driest and warmest period (August).



Grapes' maturation delayed in 2019: higher malic and tartaric acid content and lower pH in 2019.

In 2019, higher polyphenol content, HMWP, LMWP and total anthocyanins, but lower values of mDP and G in seeds.



## CONCLUSIONS & PERSPECTIVES

- Vineyards in Karst never suffered a severe water stress in both 2018 and 2019, but they displayed spatially heterogeneous responses to dry and hot spells.
- This heterogeneity was also reflected in the biochemical properties of berries, that were related to vine's water status.
- Moderate water stress might improve Teran wine quality, especially in terms of anthocyanin and proanthocyanidin content and structural characteristics of grapes.

## CREDITS, ACKNOWLEDGEMENTS & CONTACTS

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