

Drought effect on aromatic and phenolic potential of seven recovered grapevine varieties in Castilla-La Mancha region (Spain)

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INTRODUCTION

The climate change effects are seriously affecting the grape quality. High temperatures and drought cause imbalances in the chemical composition of grapes. The result is overripe grapes with low acidity and high sugar content, which produce wines with excessive alcohol content, lacking in freshness and not very aromatic. As a consequence, the search of varieties with capacity of produce quality grapes in adverse climate conditions is a good alternative to preserve the sustainability of vineyards.

In this work, quality parameters of seven *Vitis vinifera* L. varieties (five whites and two reds) recently recovered from extinction and grown under two different hydric regimes, irrigated (I) and non-irrigated (N-I), were analyzed during the 2020 vintage.

MATERIALS AND METHODS

Experimental vineyard in Tomelloso (Spain)



Harvest

In grape

In must



- 100 berry weight
- Total polyphenol index (TPI)
- Varietal aroma potential index (IPAv)

- Brix degree
- Total acidity
- Malic acid
- pH
- $\delta^{13}C$
- $\delta^{18}O$

RESULTS AND DISCUSSION

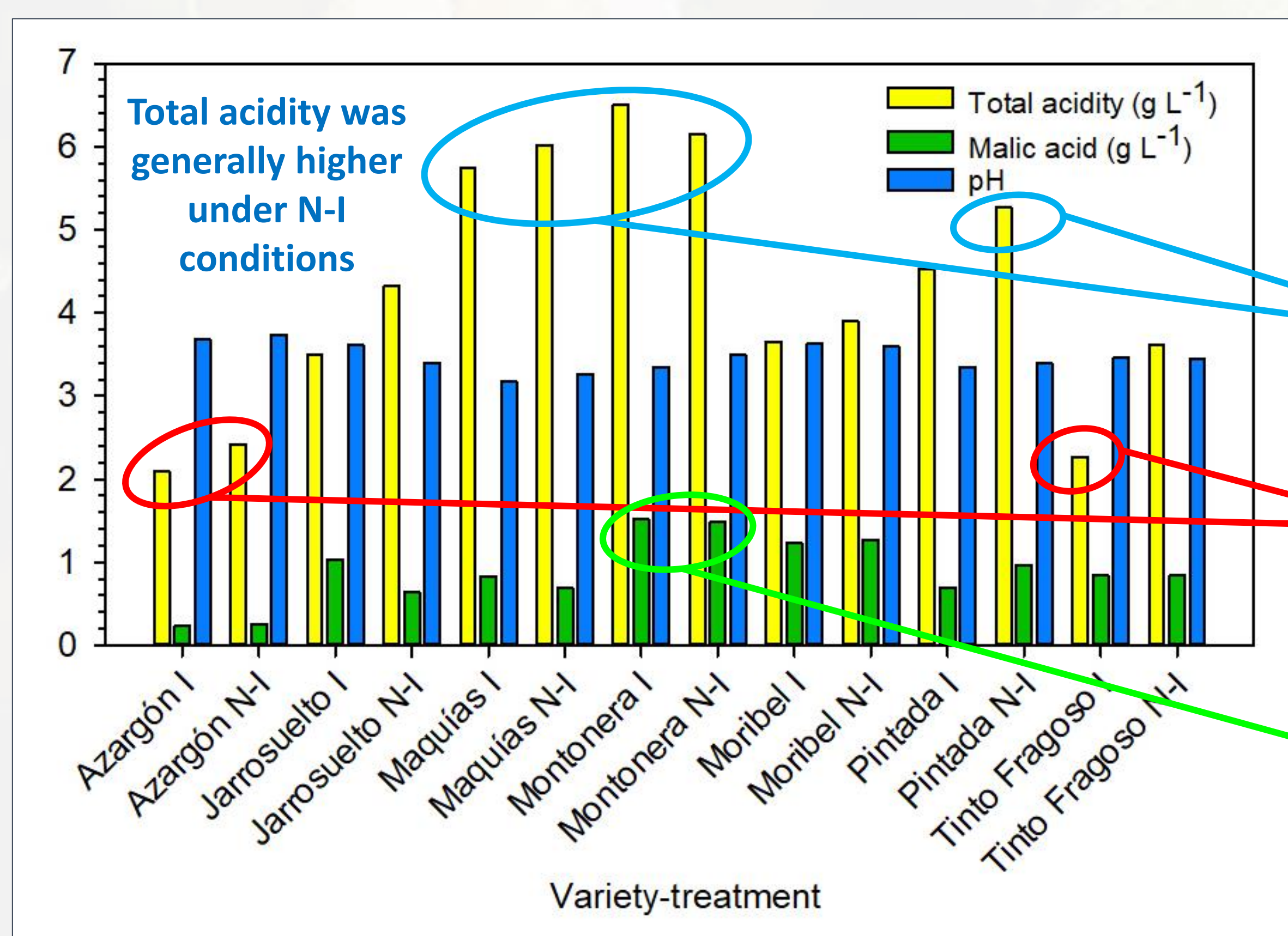
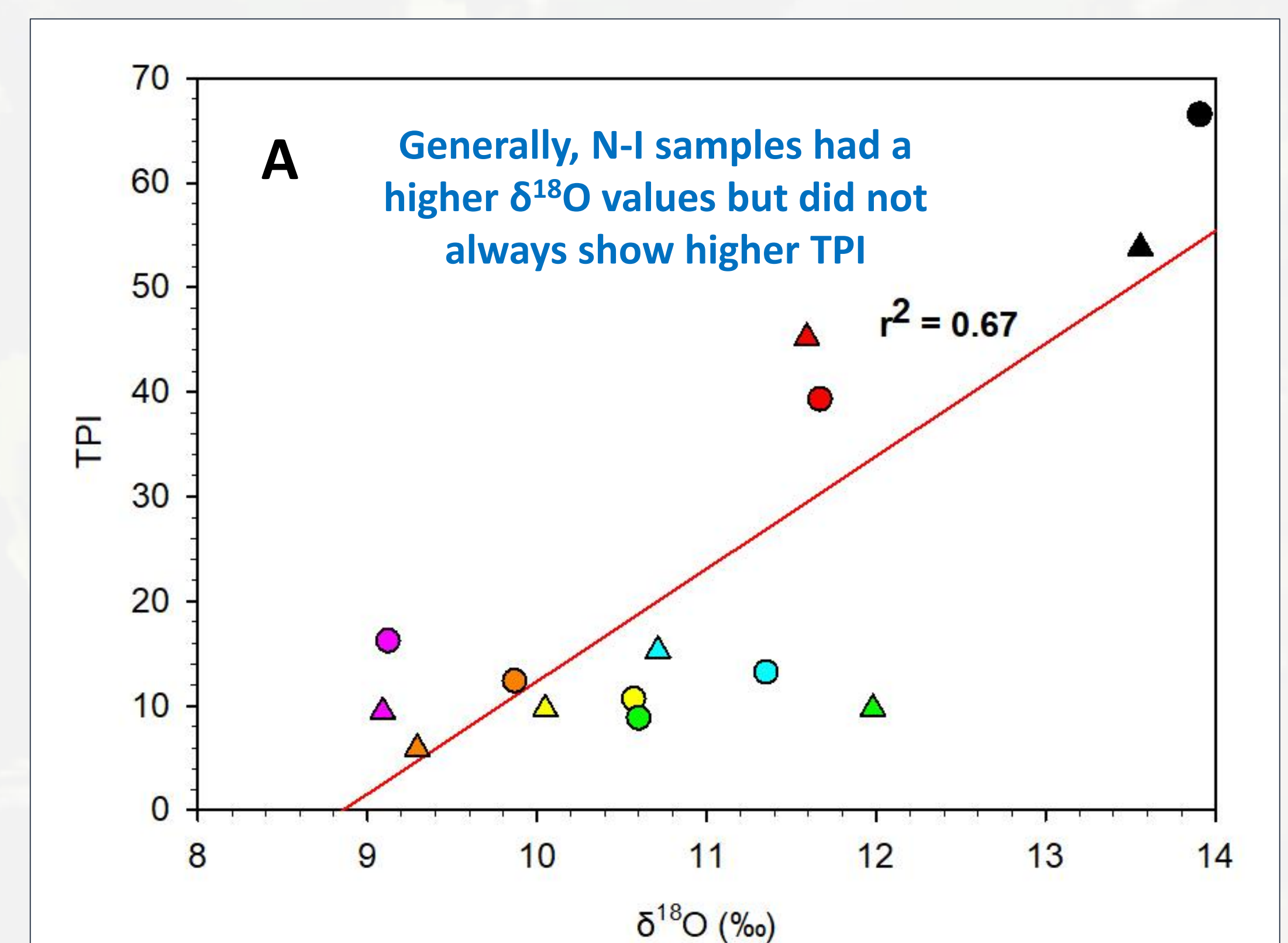
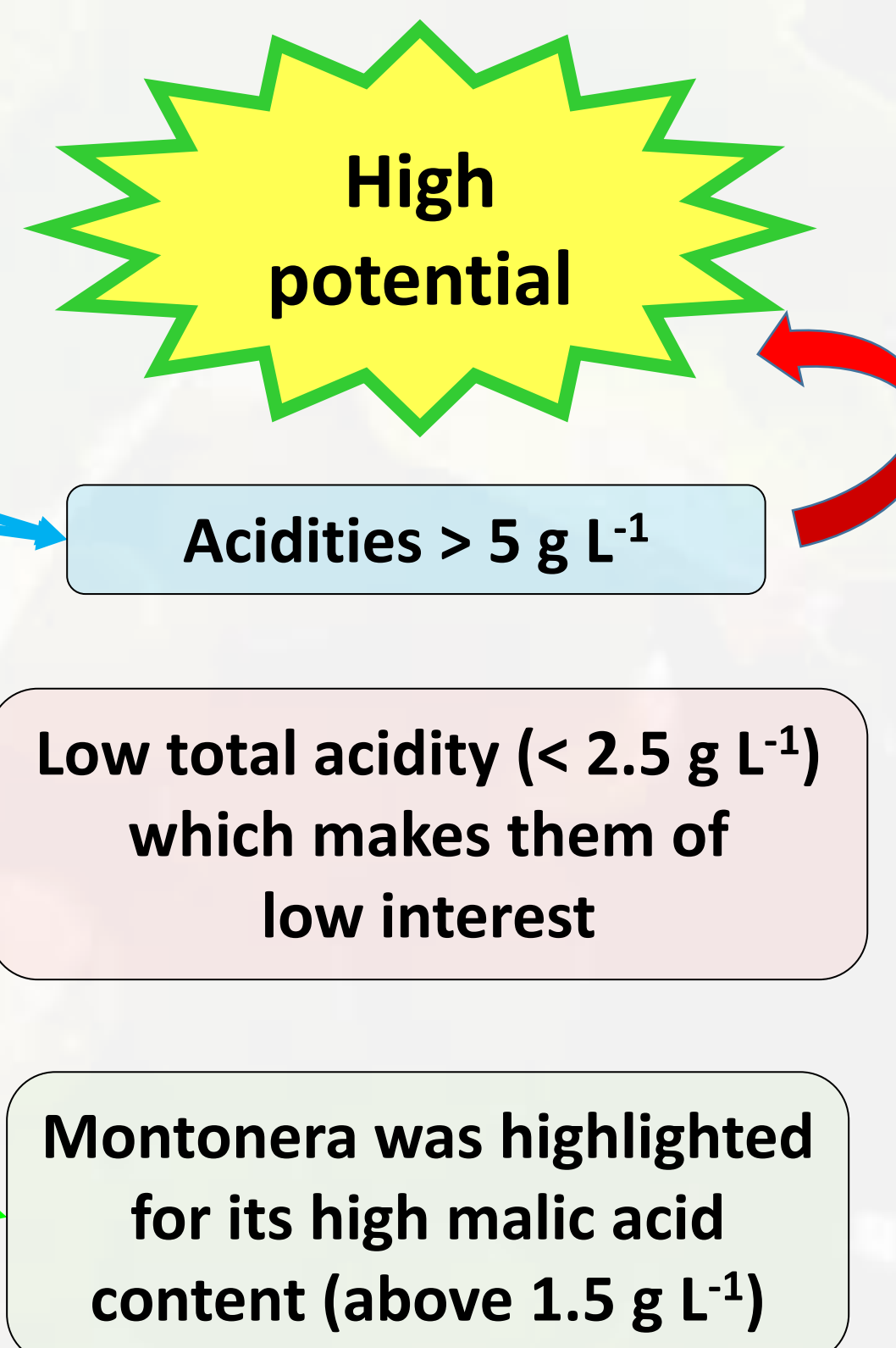


Figure 1. Total acidity, malic acid and pH values.



A highly significant relationship was obtained between mean values of TPI and $\delta^{18}O$ (Figure 4A, $p < 0.001$, $r^2 = 0.67$) indicating that generally the higher the $\delta^{18}O$, the higher the TPI

As expected, IPAv was negatively correlated with berry weight (Figure 4B), although it was less significant than in the case of TPI with $\delta^{18}O$ ($p < 0.01$, $r^2 = 0.45$)

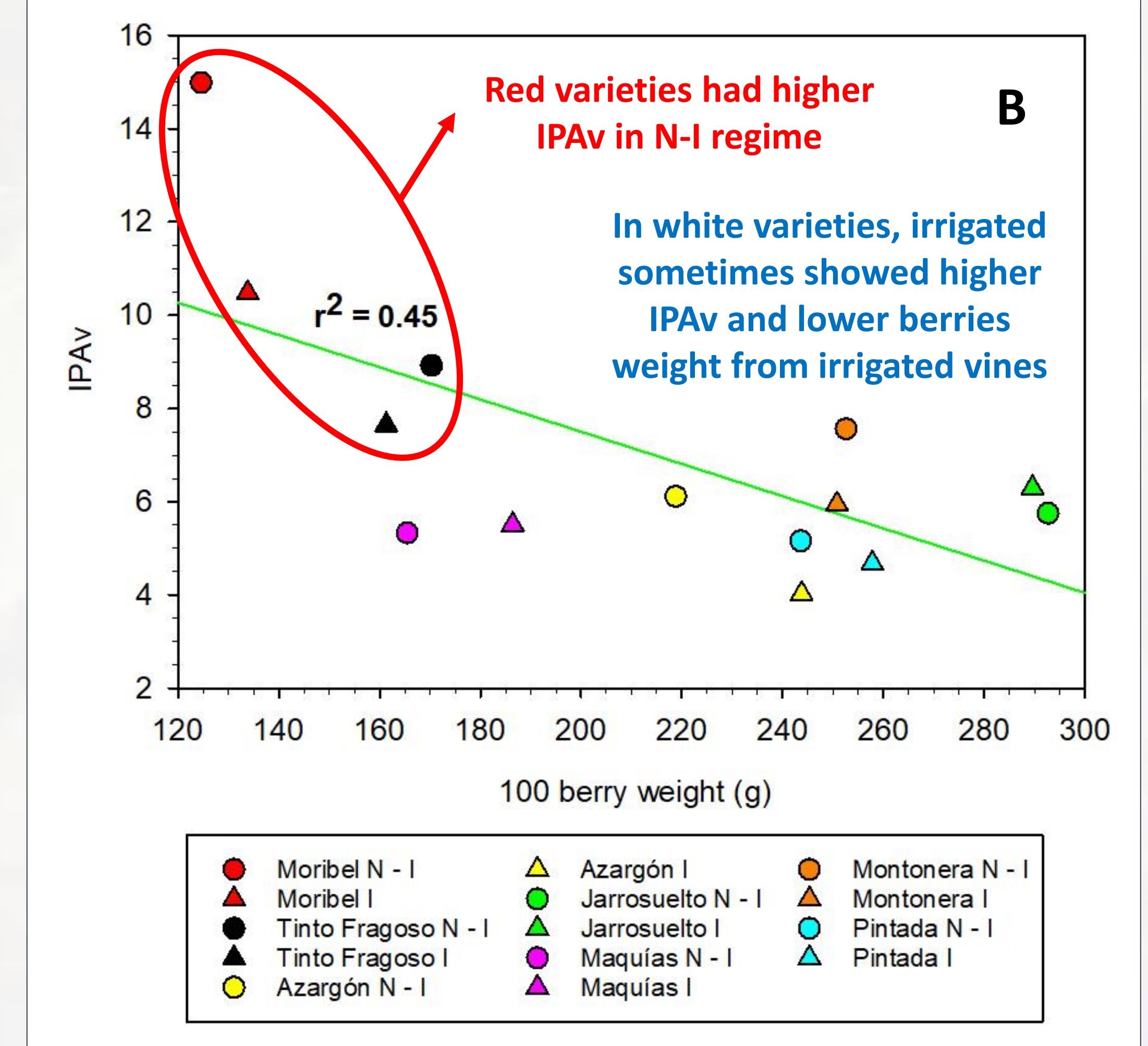


Figure 4. Lineal fit obtained between TPI - $\delta^{18}O$ (A) and IPAv - 100 berry weight (B).

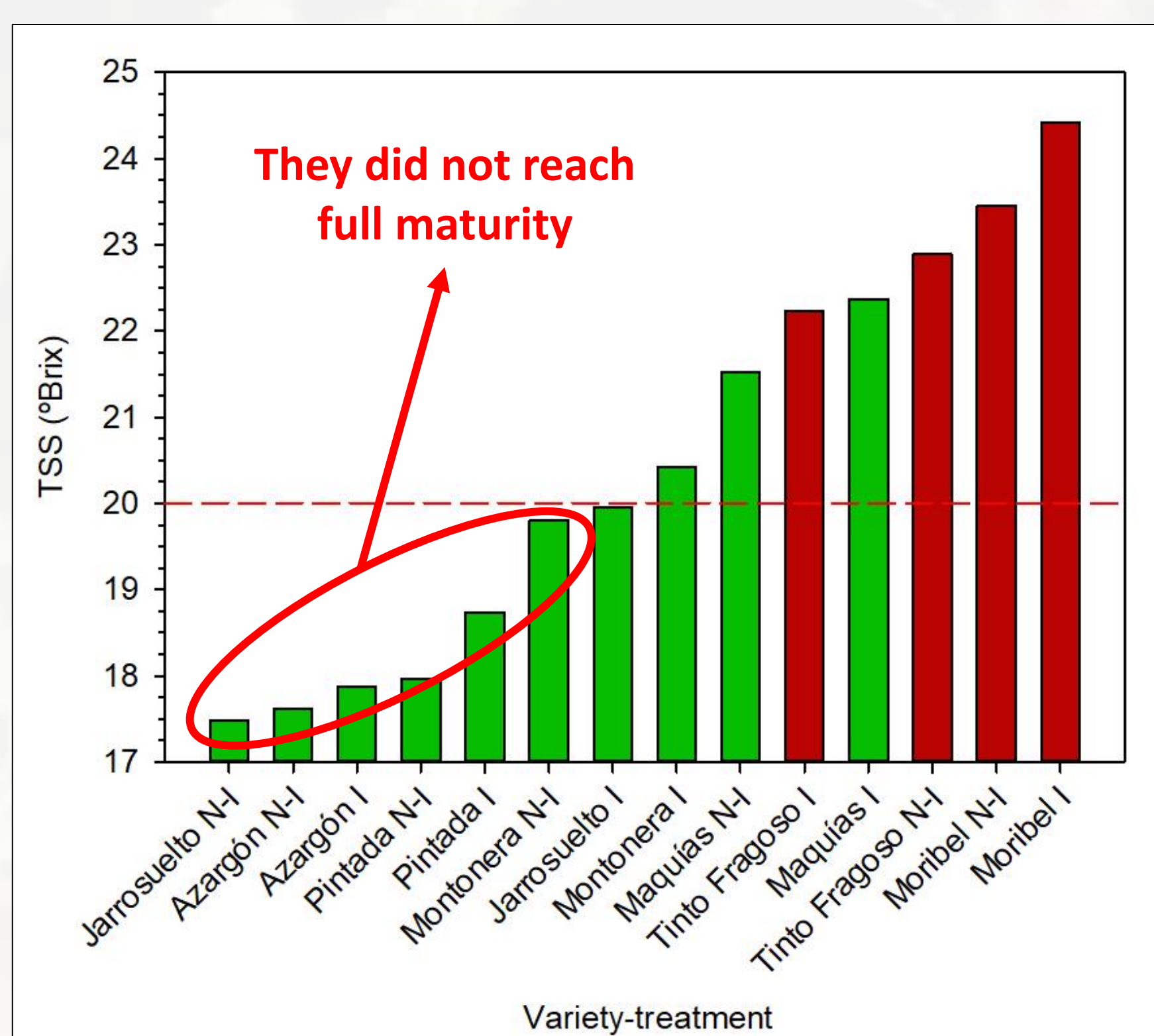


Figure 2. Total soluble solid values. Green bars: white variety, red bars: red variety.

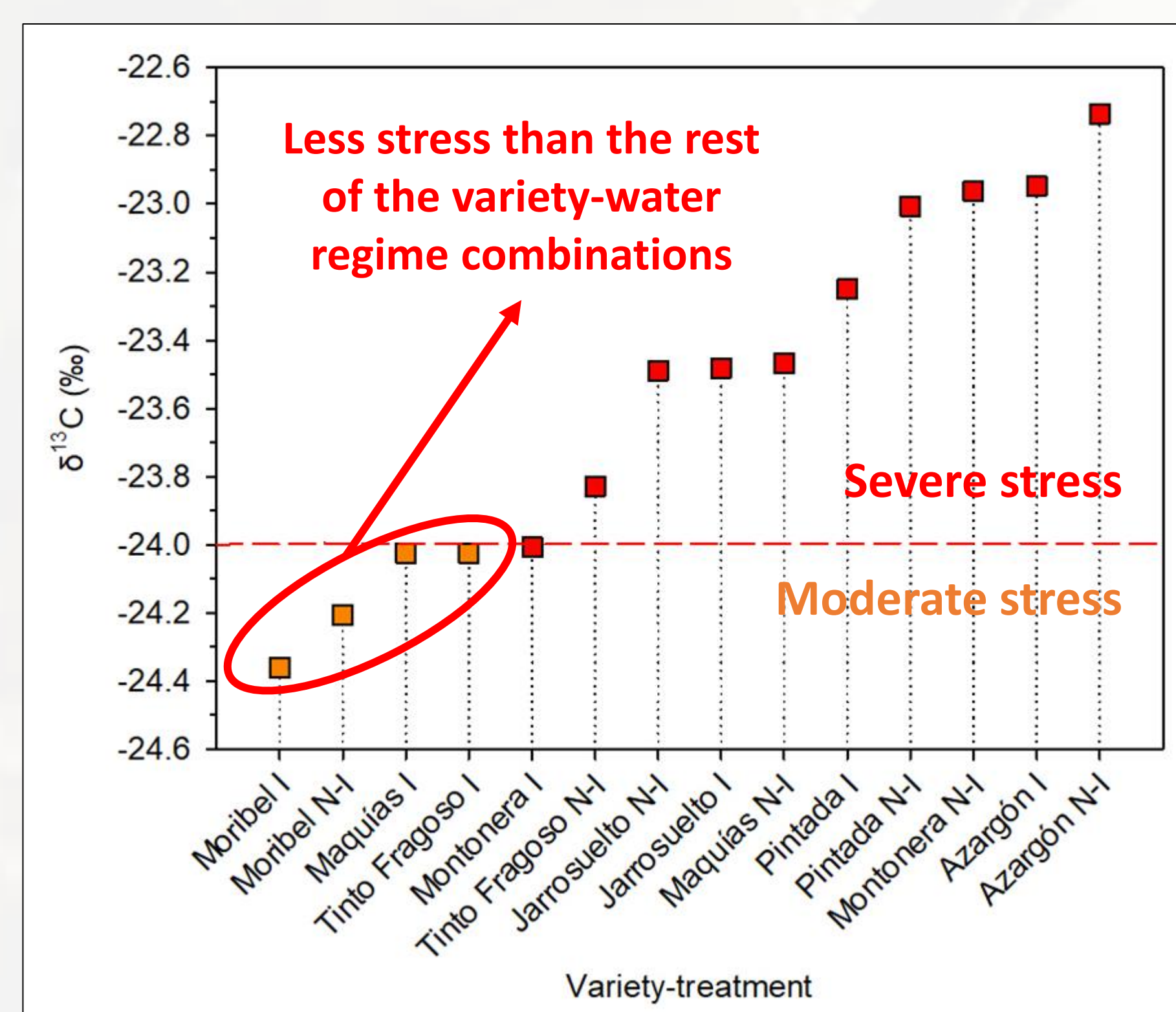


Figure 3. Carbon isotope ratio values. Red squares: severe stress, orange squares: moderate stress.

CONCLUSIONS

The results of this study reveal that drought does not improve the grape quality in all varieties. Generally, in the red varieties, drought improved the quality of their grapes, but this was not the case for all the white varieties. Among the red ones, Moribel stood out for its high varietal aromatic potential and Tinto Frago for its high TPI values, both showing relatively low levels of water stress. Among the white ones, Montonera and Maquías stood out for having high values of both acidity and IPAv. Azargon showed high levels of water stress but did not reach full maturity and had the lowest acidity values. In addition, its IPAv values were low, especially under irrigation regime. Although the total acidities of Jarrosuelto were relatively low, it had a relatively high IPAv and the highest berry weight among all the white varieties.