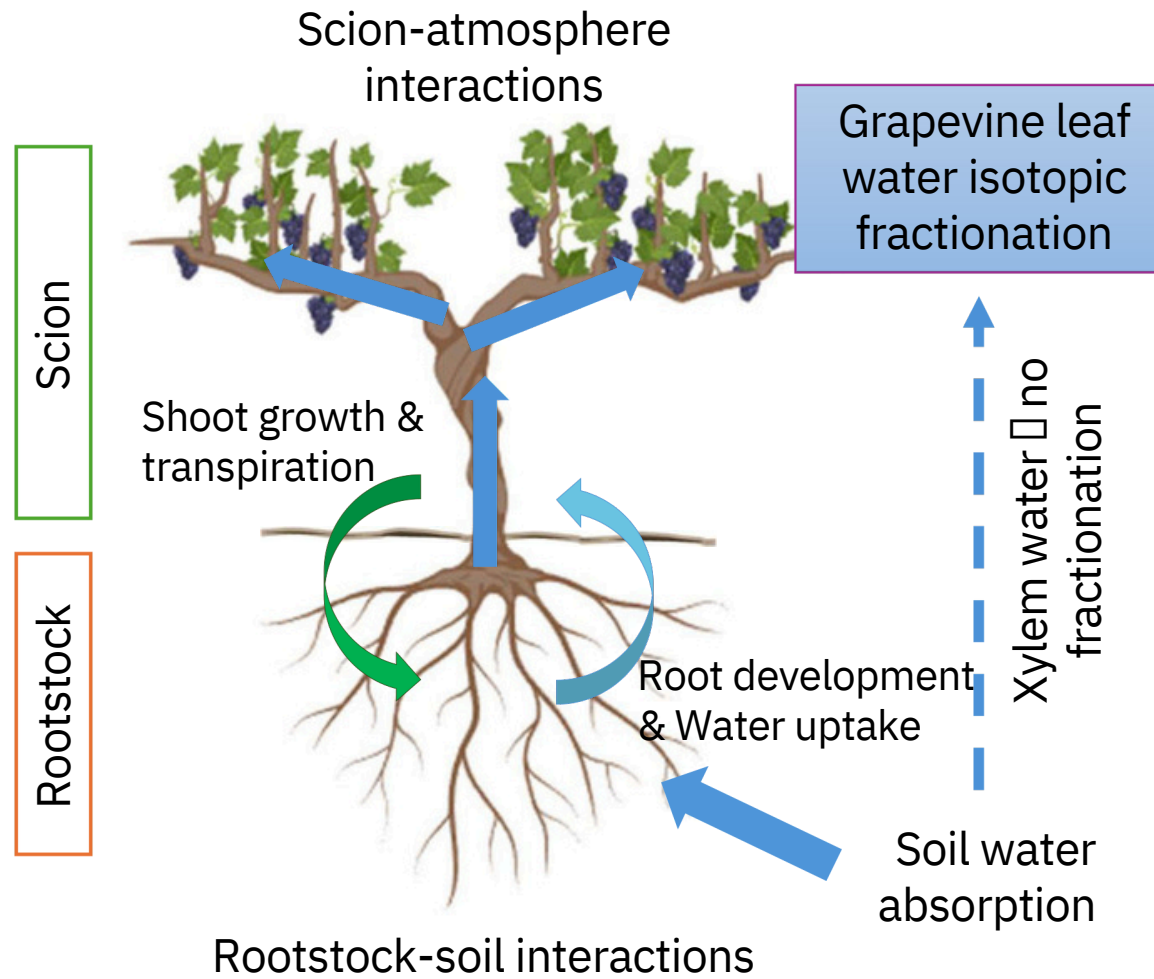


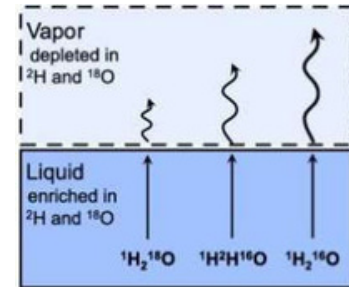
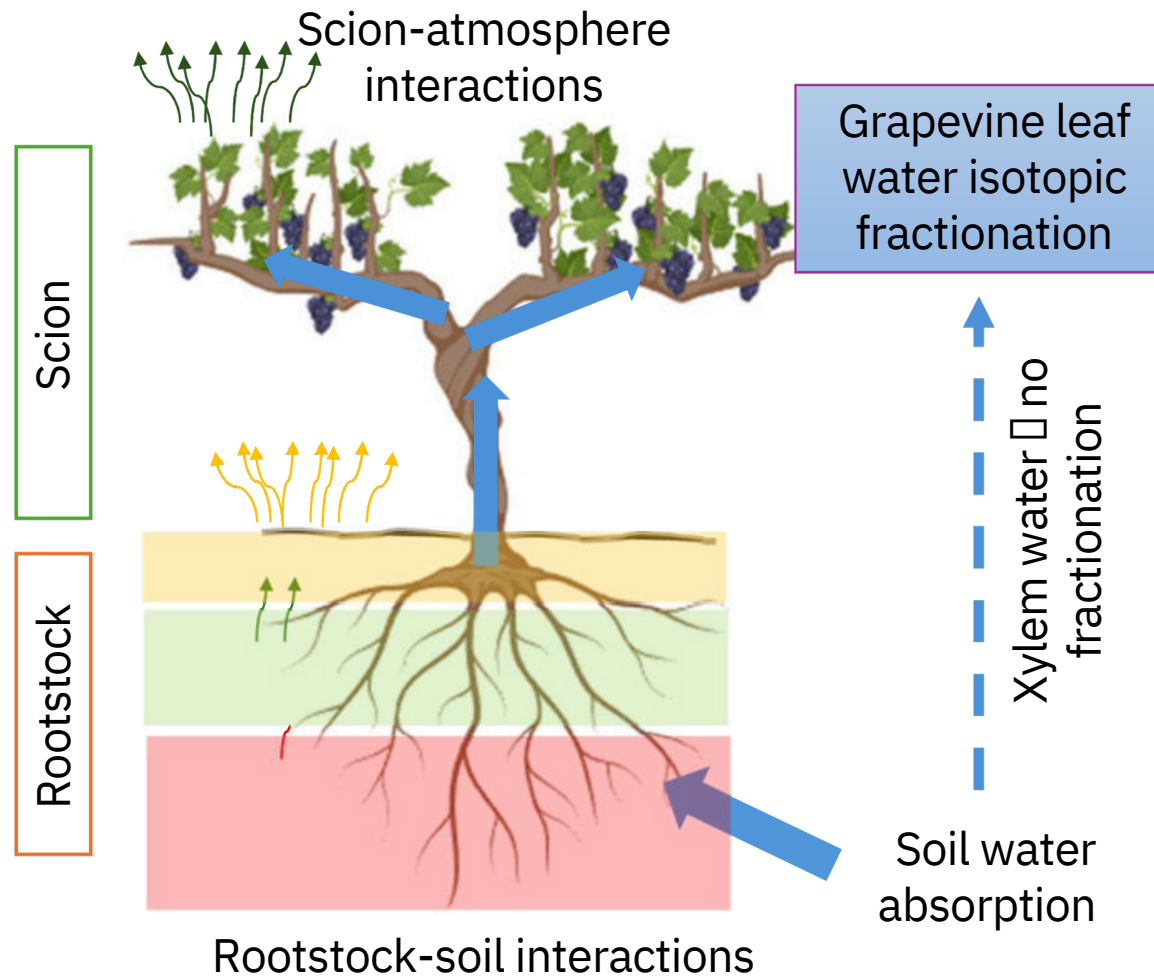
Root water uptake patterns in Rootstock-Scion interactions influence grape water use strategies in a Mediterranean vineyard

Olfa Zarrouk, Miguel Damásio, Itxaso Ruiz, Shawn C
Kefauver, Adrià Barbeta

Scion -Rootstock interaction

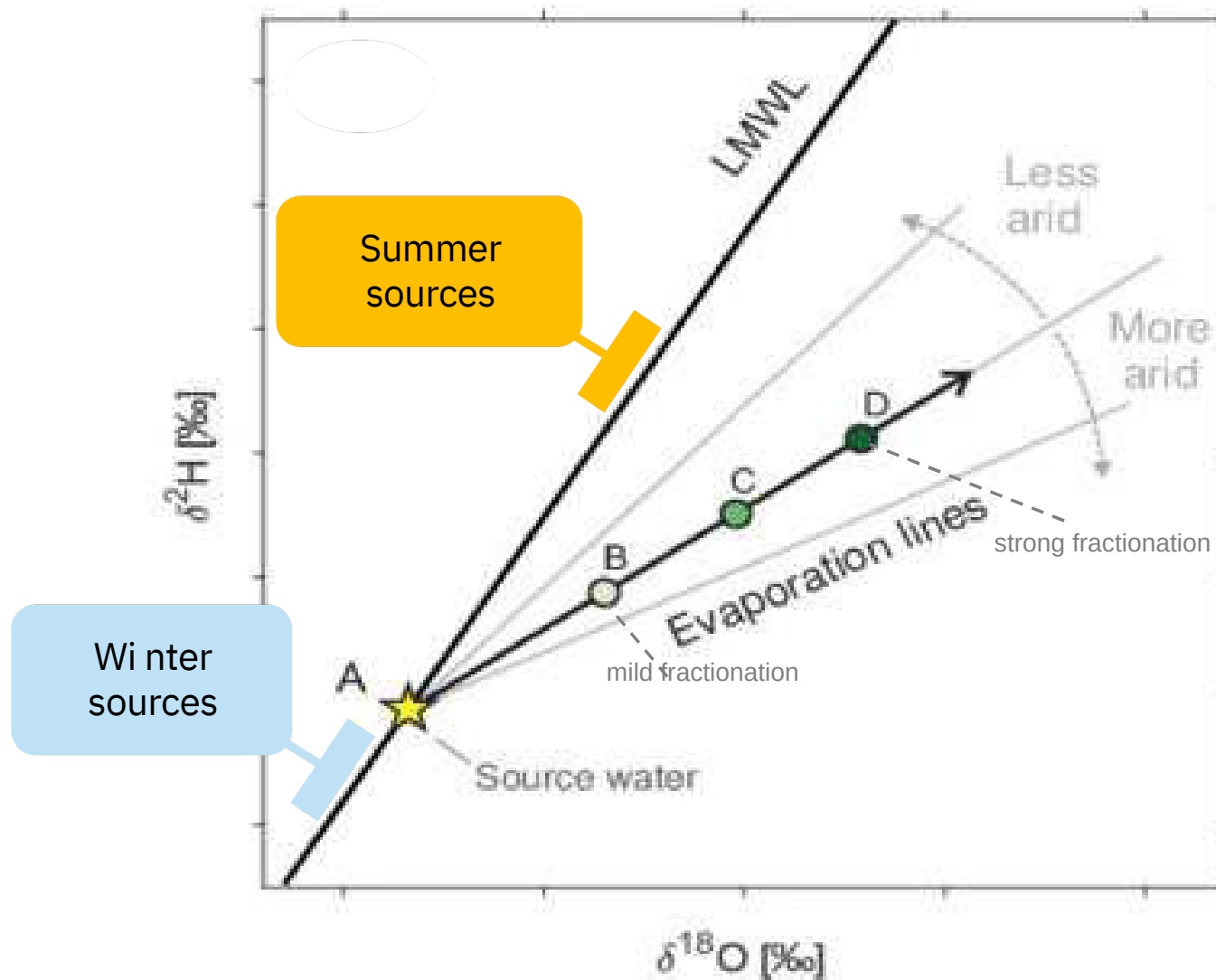


Scion -Rootstock interaction



Benettinet al. 2018 (doi:
10.5194/hess-22-2881-2018)

Water sources isotopic signature



Adapted from: Benettin et al. 2024
(doi: 10.1002/eco.2711)

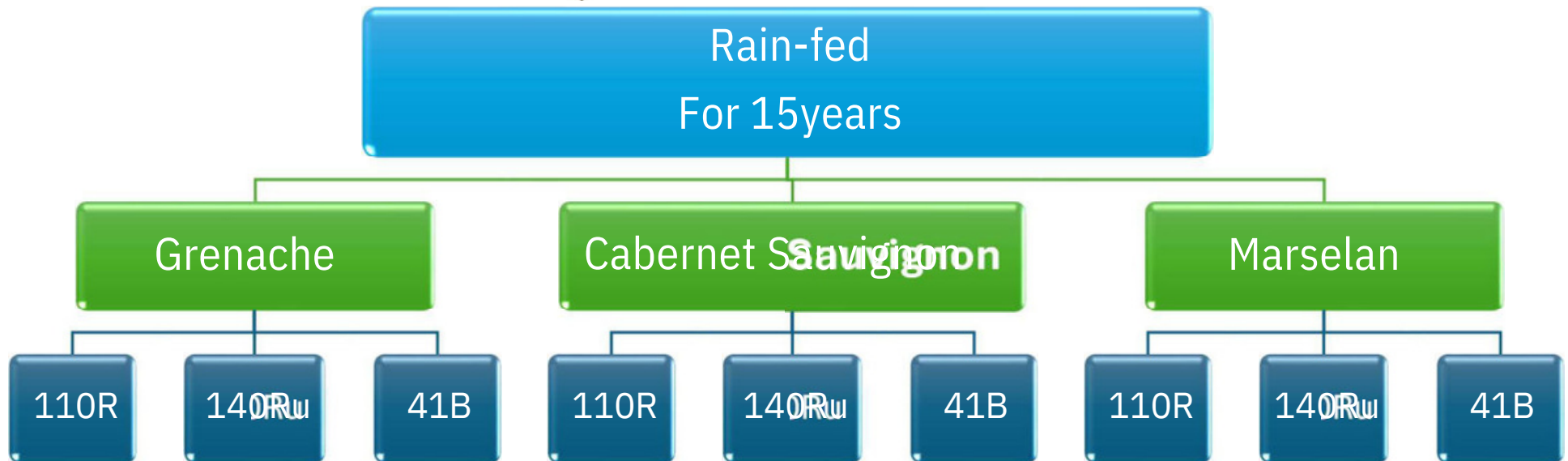
Experimental set up



Experimental vineyard at
Torre Marimon (Barcelona)



3 blocks of 3 grapevines per combination:
-3 cultivars
-3 Rootstocks

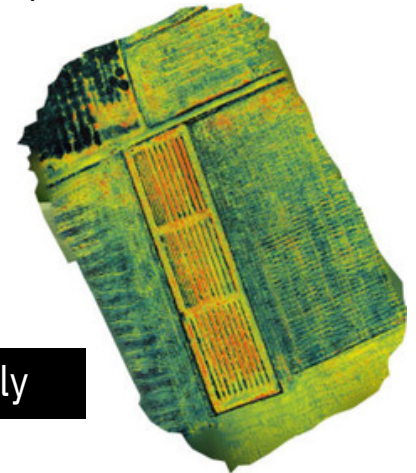


Experimental set up

- Waterpotential: ψ_{pd} ; ψ_{md}
- Gasexchange: Li-6800
- Fluorescence and gs: Li-600f



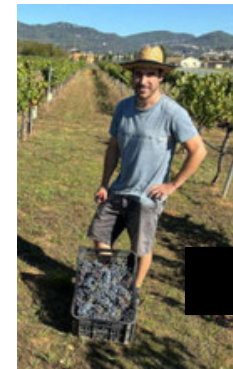
Drone flights: RGB, NIR and thermal imaging



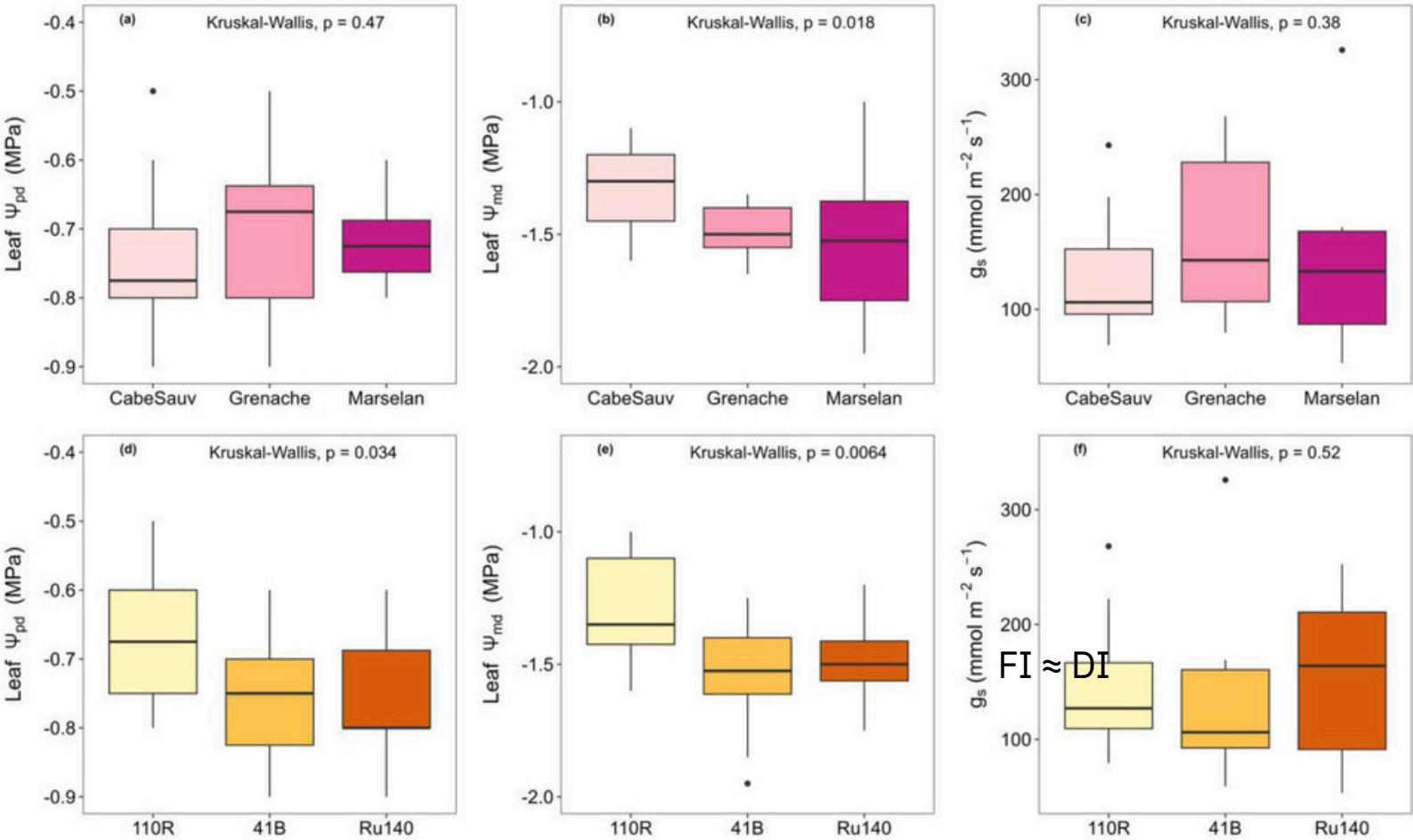
Stem and soil extraction for water
Isotopic analysis



Yield and carbon isotope



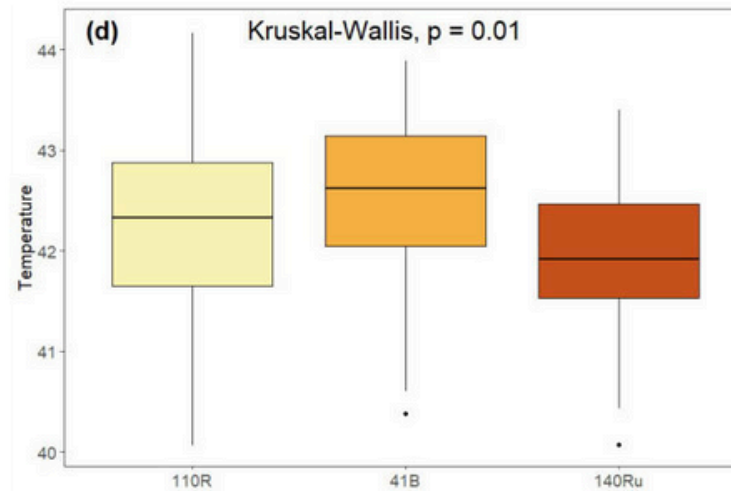
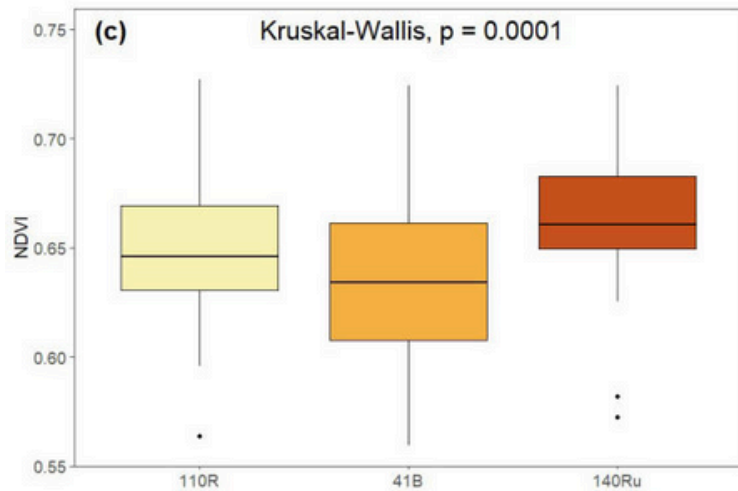
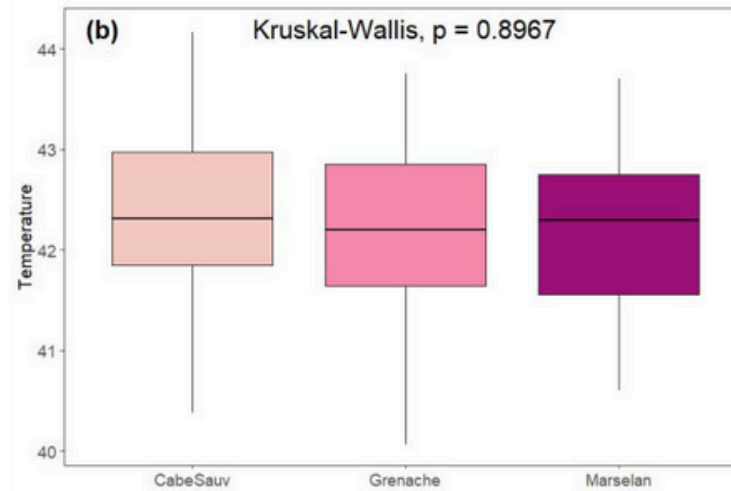
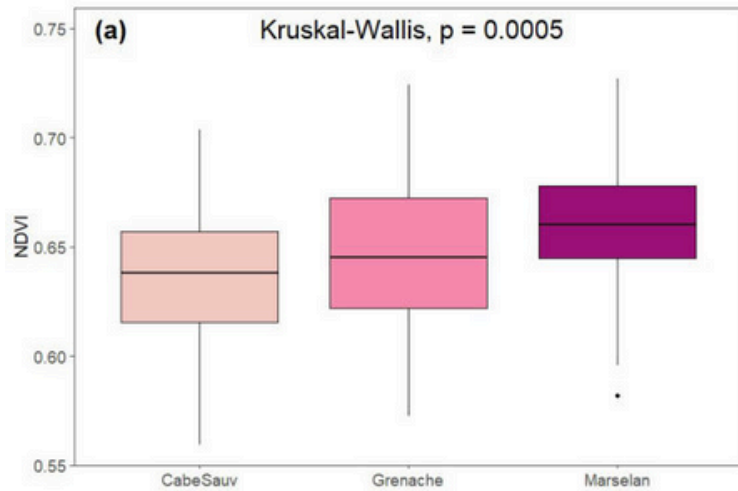
Leaf water potential and stomatal conductance



Ψ_{pd}	Cultivar $\approx$	Rootstock $\neq$
Ψ_{md}	Cultivar $\neq$	Rootstock $\neq$
g_s	Cultivar $\approx$	Rootstock $\approx$

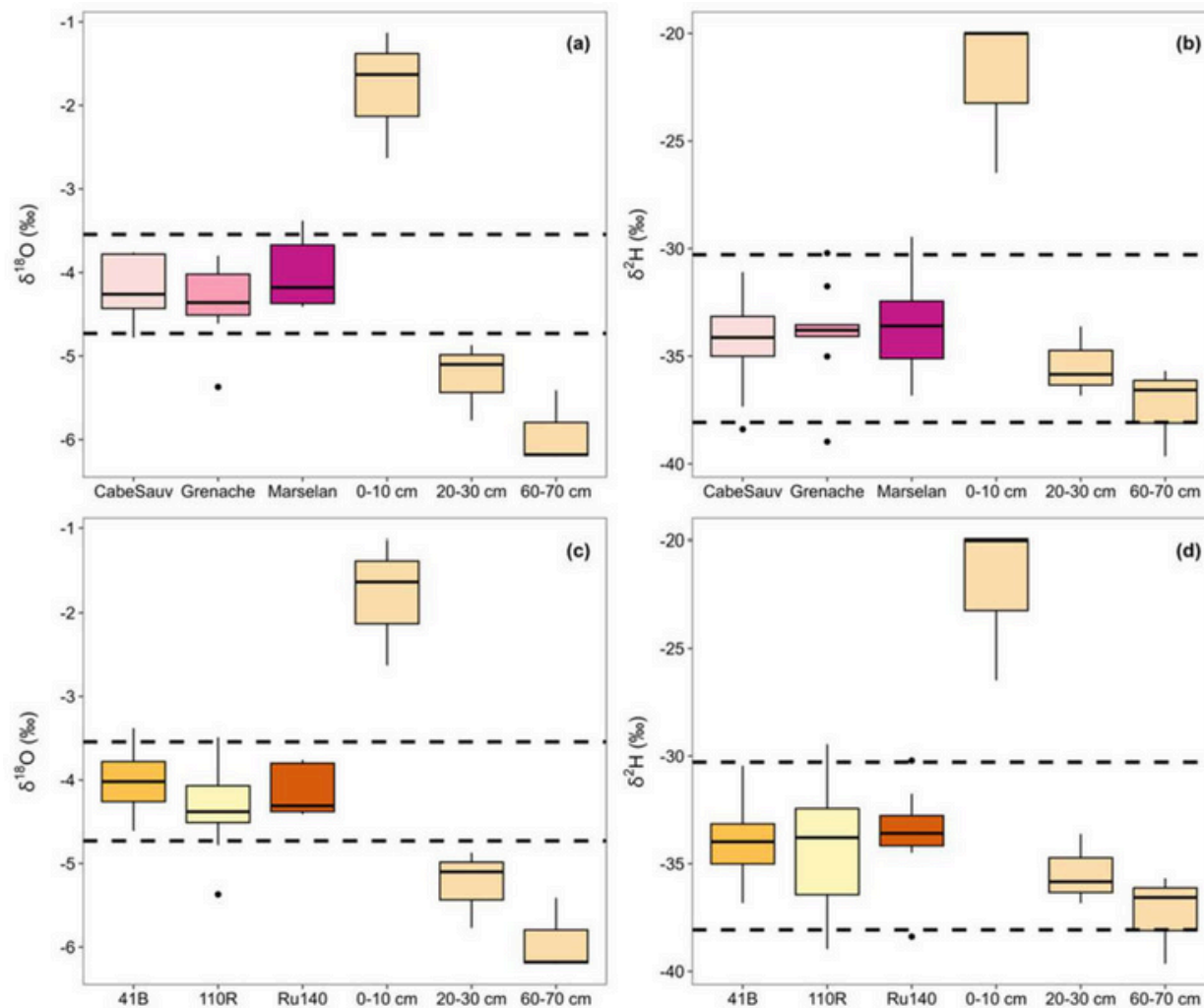
FI $\approx$ DI

Remotesensing: NDVI and Thermalimaging



NDVI
Cultivar $\neq$ Rootstock $\neq$
Thermal
Cultivar $\approx$ Rootstock $\neq$

Genotype effects on xylem watersources-July

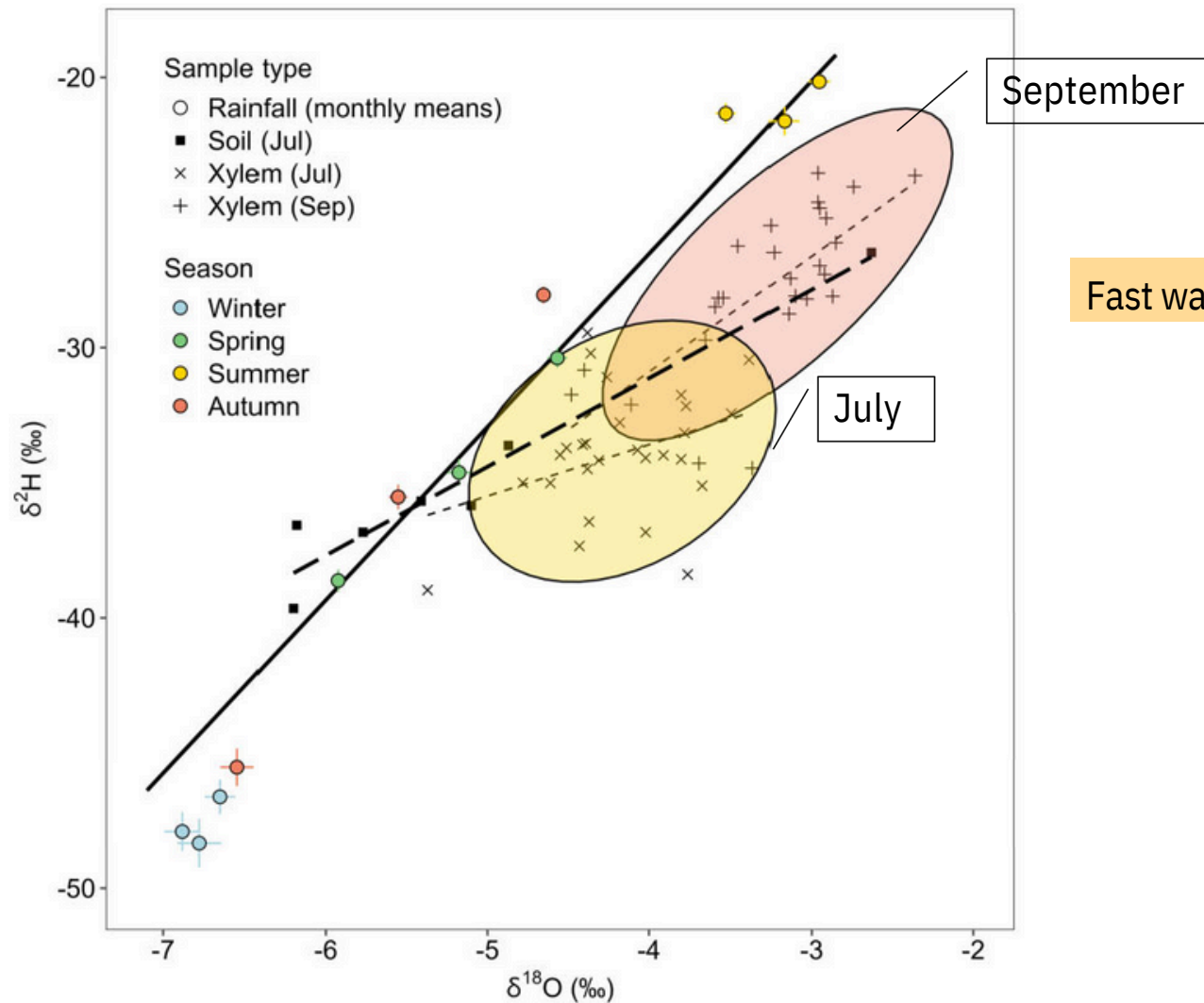


Water source □

- 10 –20 cm
- ormix0 –30 cm

Depth of soil water uptake
notrelatedto rootstock□
other root traits should be
considered.

Seasonal water use & water source origin in dual-isotope space





Take home messages

- Under long-term drought conditions, the root growth capacity is reduced and the rootstock effect becomes minimal.
- Under rainfed conditions, the soil available water is mainly from spring rainfall.
- Grapevine roots are able to uptake new source water quickly even at the end of the season.
- Scion-Rootstock interaction was evident in: - grapevine water status - vigor (NDVI) - canopy temperature
- Water isotopic analysis is a suitable technique to trace the active roots depth and the origin of absorbed water in grapevine



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- University of Barcelona: Shawn Kefauver
- FruitCrews

