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Managing vegetated water harvesting structures: effect of vegetation management on infiltration for better drought resilience in mediterranean agroecosystems

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MANAGING VEGETATED WATER HARVESTING STRUCTURES:

EFFECT OF VEGETATION MANAGEMENT ON INFILTRATION FOR BETTER DROUGHT RESILIENCE IN MEDITERRANEAN AGROECOSYSTEMS

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Issues

Water conservation in rainfed agroecosystems



Cropped & Semi-natural Shared Land

runoff

vs

infiltration



Rockstrom and Falkenmark 2015

Soil

Smith 1949

×

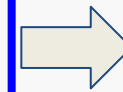
Vegetation
(crops, service plant)

Doussan and Pagès 2018
Bodner et al 2008

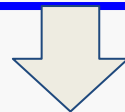
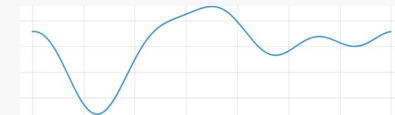
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Practices

Coulouma et al 2006
Meek et al 1992

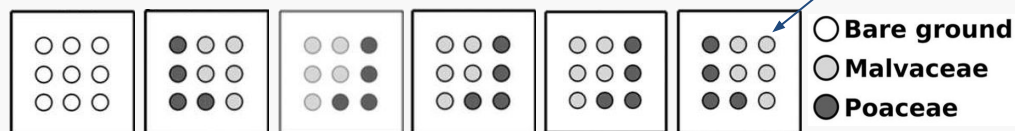
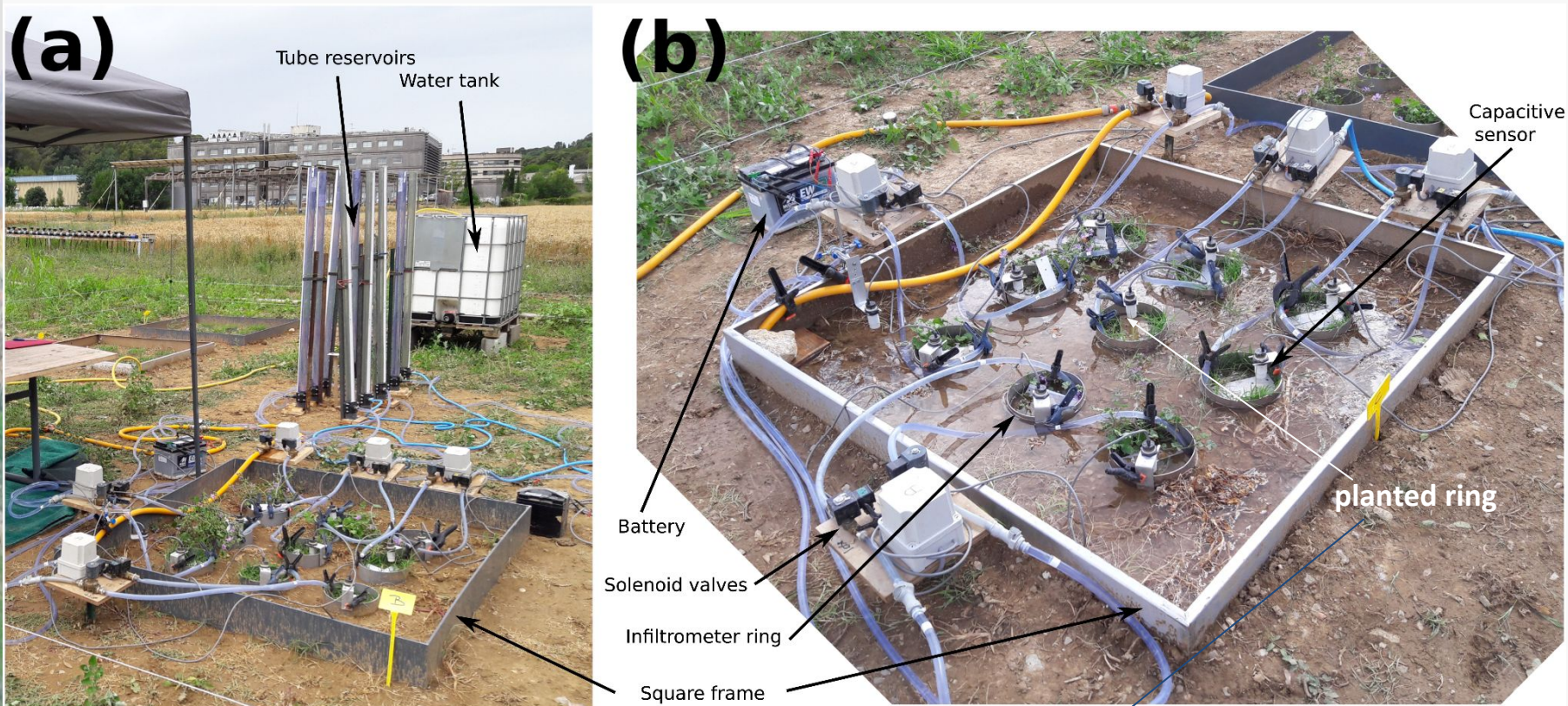


time varying effects



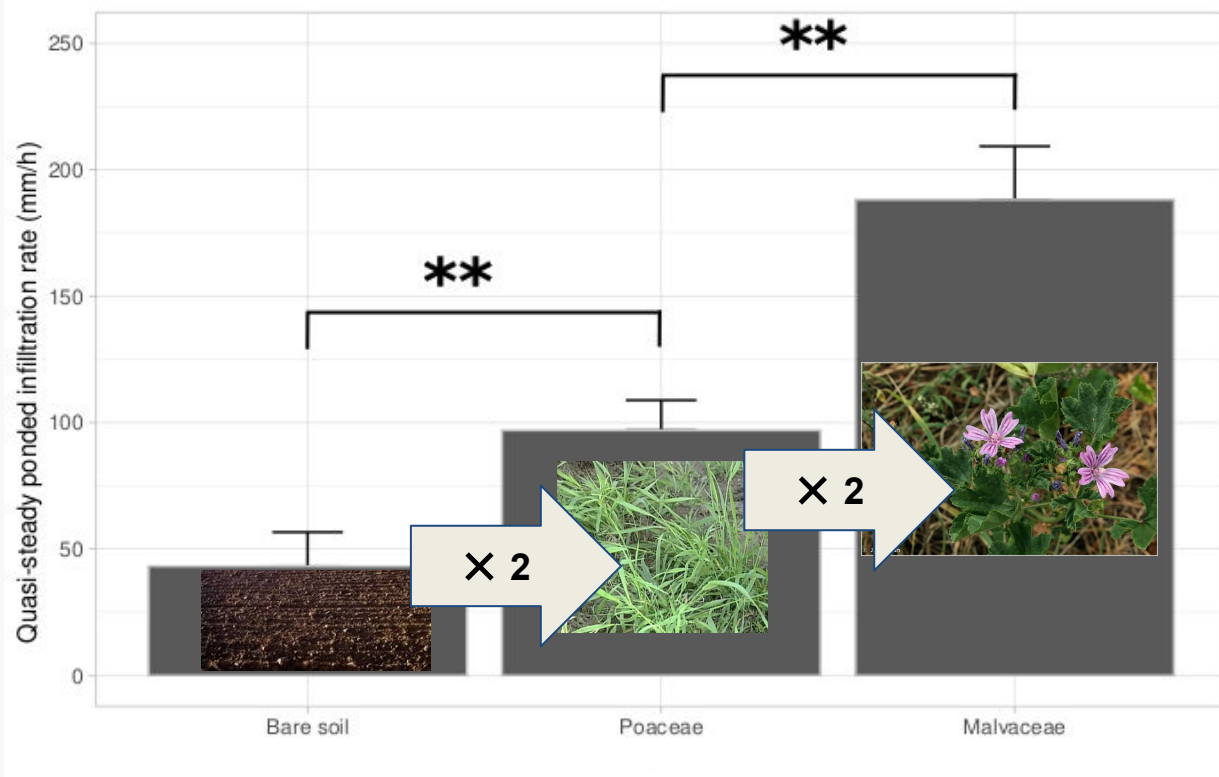
How soil infiltrability changes over time under different plant covers and cover management techniques?

A device and design for soil infiltrability differentiation

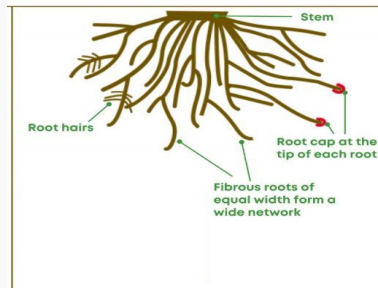


A replicated and automated Müntz device for **soil infiltrability**
(quasi-steady ponded water infiltration rate)

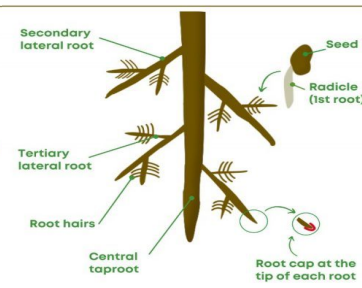
Rapid effect of root system on soil infiltrability



**TYPICAL MONOCOTYLEDON
ROOT SYSTEM**
(Fibrous roots)

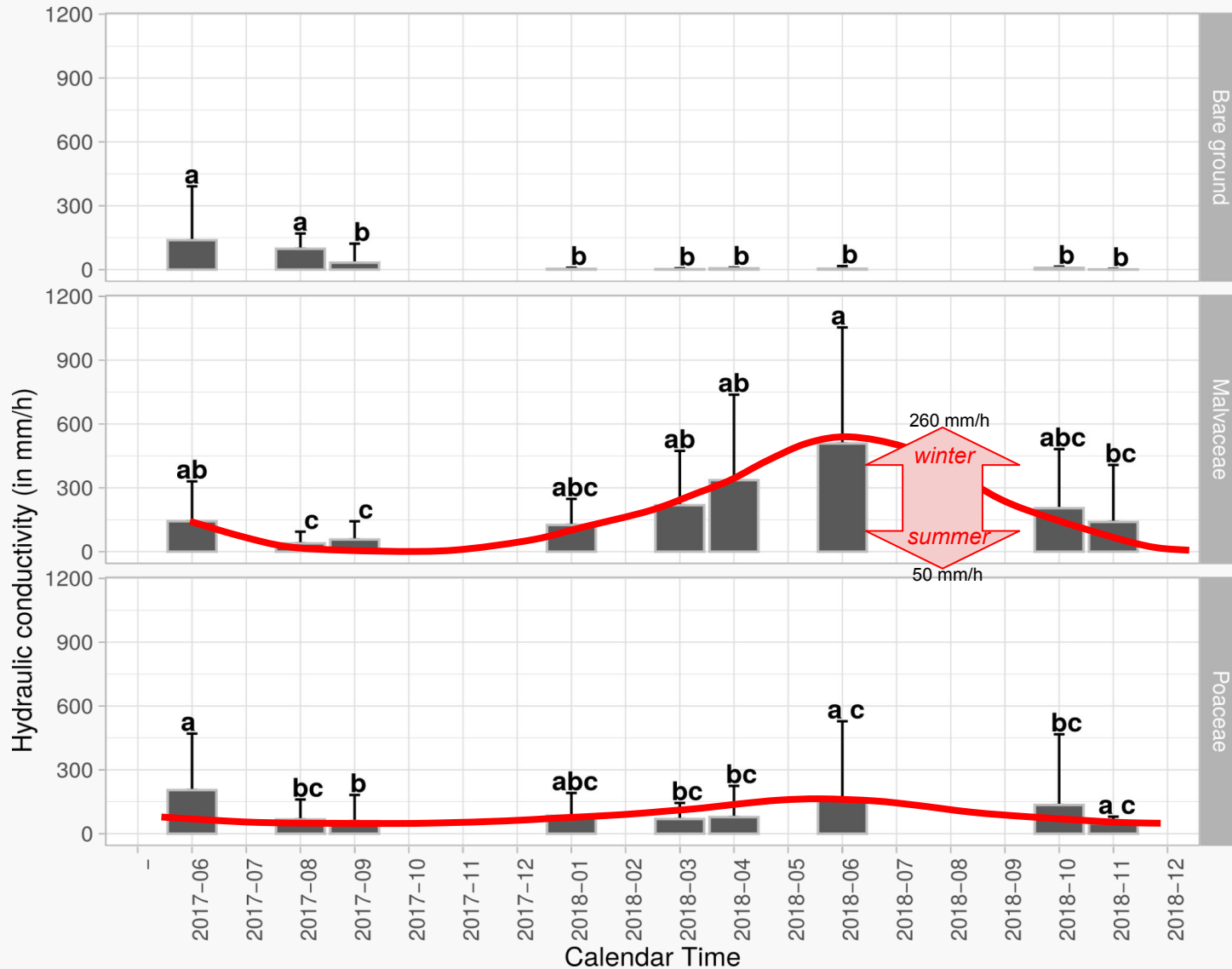


**TYPICAL EUDICOTYLEDON
ROOT SYSTEM**
(Taproot and Lateral branching roots)

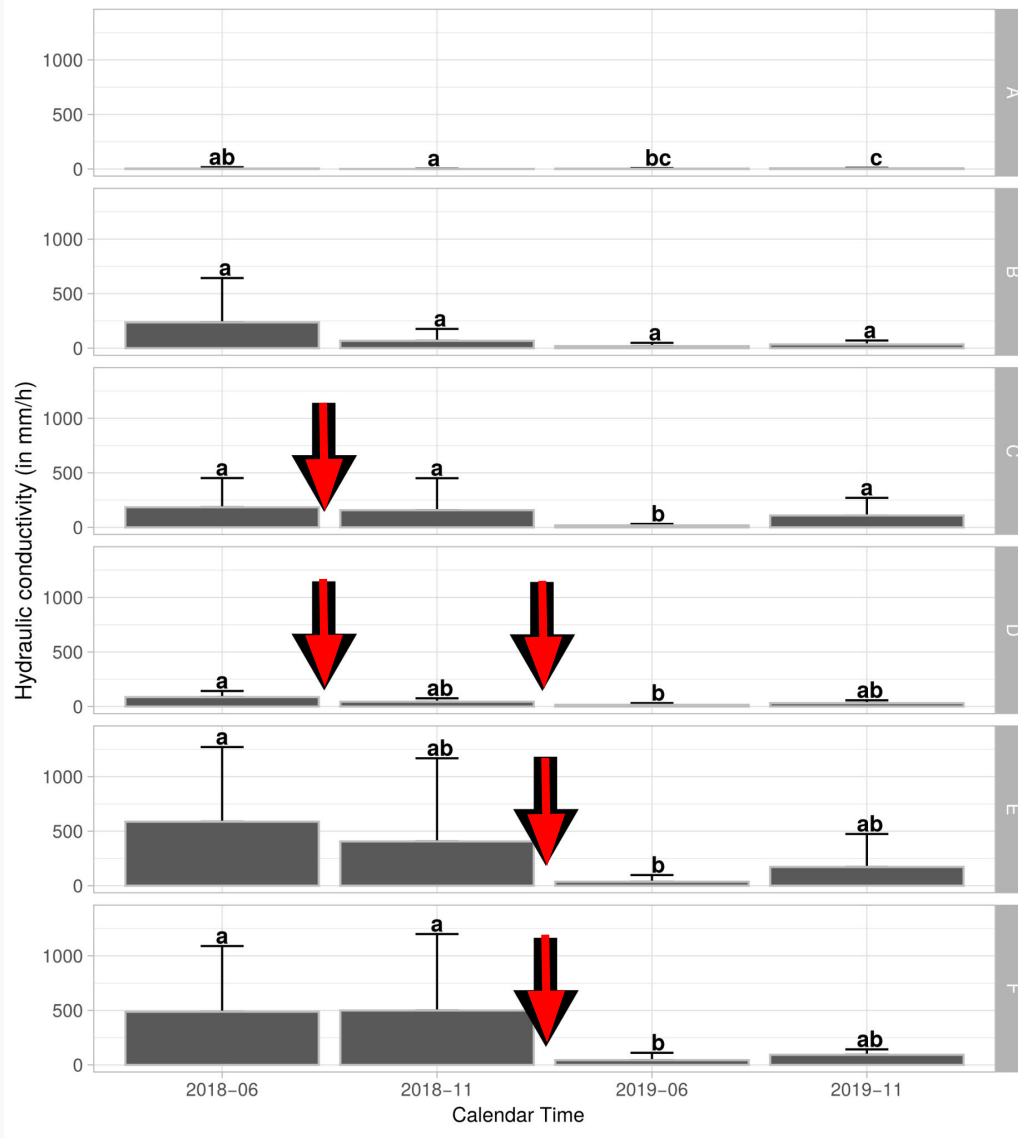


Leafy Learning ©

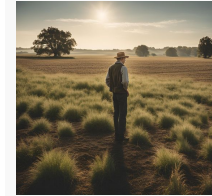
Seasonal variation of soil infiltrability



Minor vegetation management effect at short term



bare soil



control



burning



mowing x 2



mowing x 1



chemical weeding

Conclusion and perspectives

- Short term effect: better consider both seasonal and functional traits of plants to maximize soil infiltrability



- Long term monitoring (> 2 years) required to better identify vegetation management effect on soil infiltrability
- Integration in an ecohydrological model to evaluate effects at landscape scale

More details:

<https://doi.org/10.1016/j.still.2023.105985>

