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

Jean-Stéphane Bailly, Fabrice Vinatier, Gabrielle Rudi, Guillaume Coulouma, Cécile Dagès

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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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Session GC51S: Nature-Based Solutions to Ensure Food and Water Security in Rising Aridity Regions

Issues

Water conservation in rainfed agroecosystems

Cropped & Semi-natural Shared Land

runoff *vs* **infiltration**

Soil ✖ Vegetation (crops, service plant) ✖ Practices

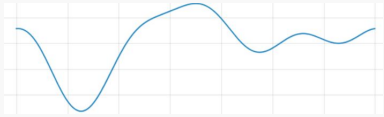
Smith 1949

Doussan and Pagès 2018
Bodner et al 2008

Coulouma et al 2006
Meek et al 1992

Rockstrom and Falkenmark 2015

time varying effects



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

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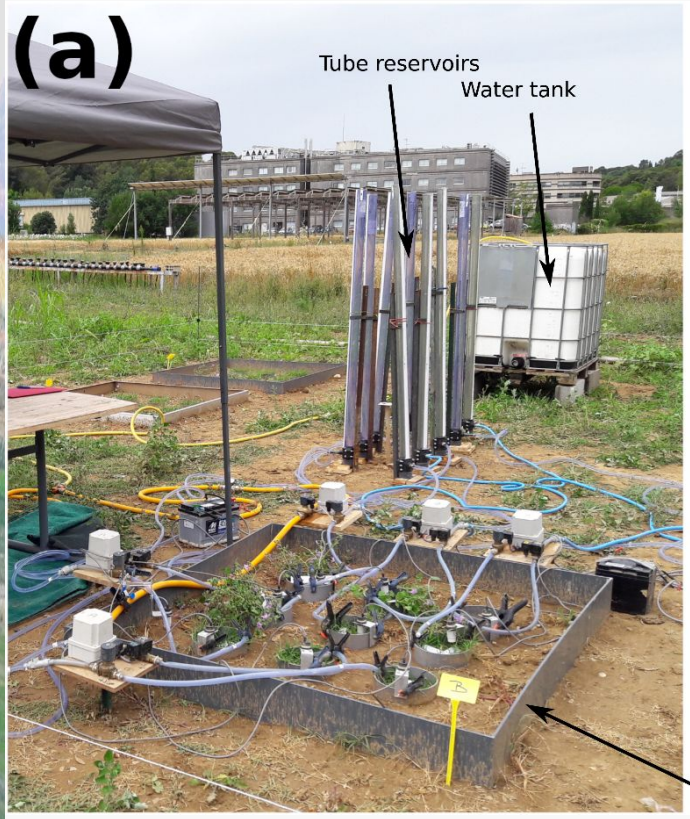
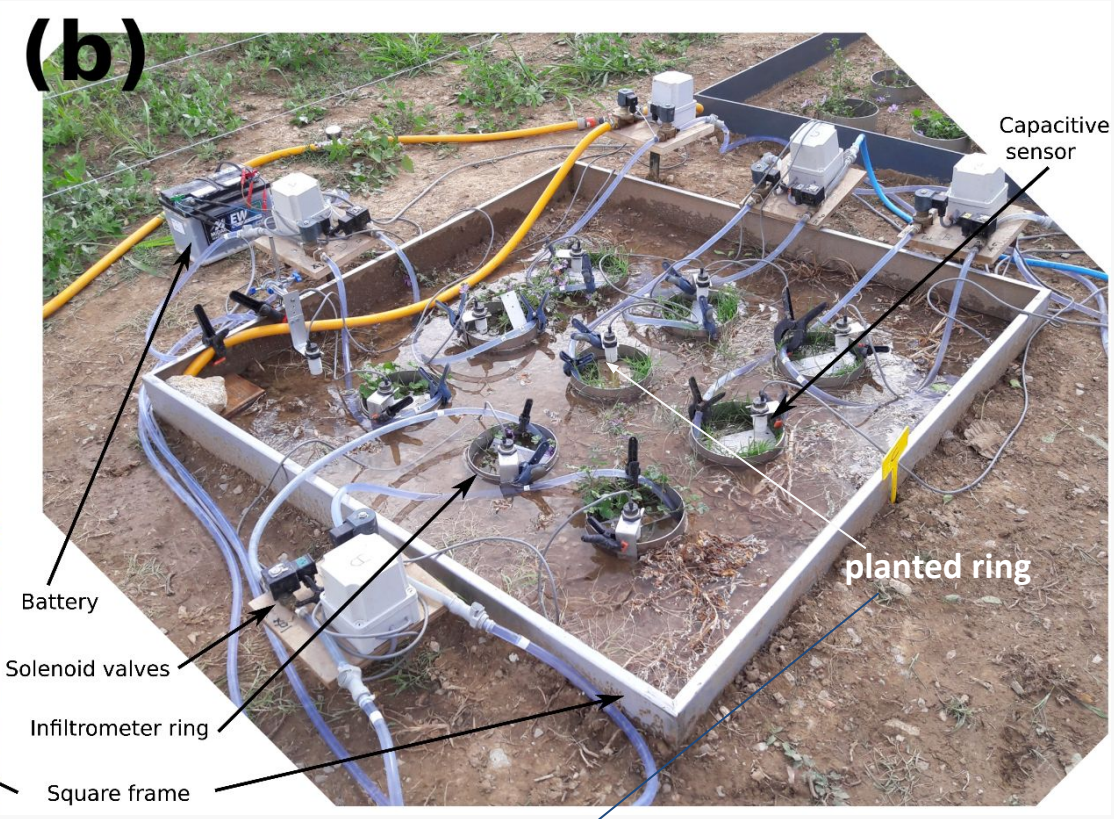
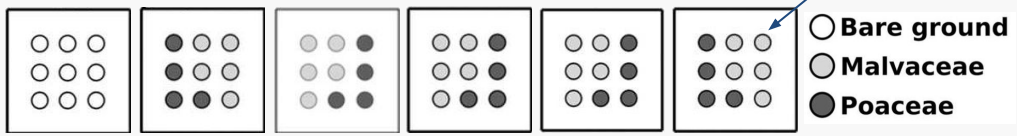
A device and design for soil infiltrability differenciation







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

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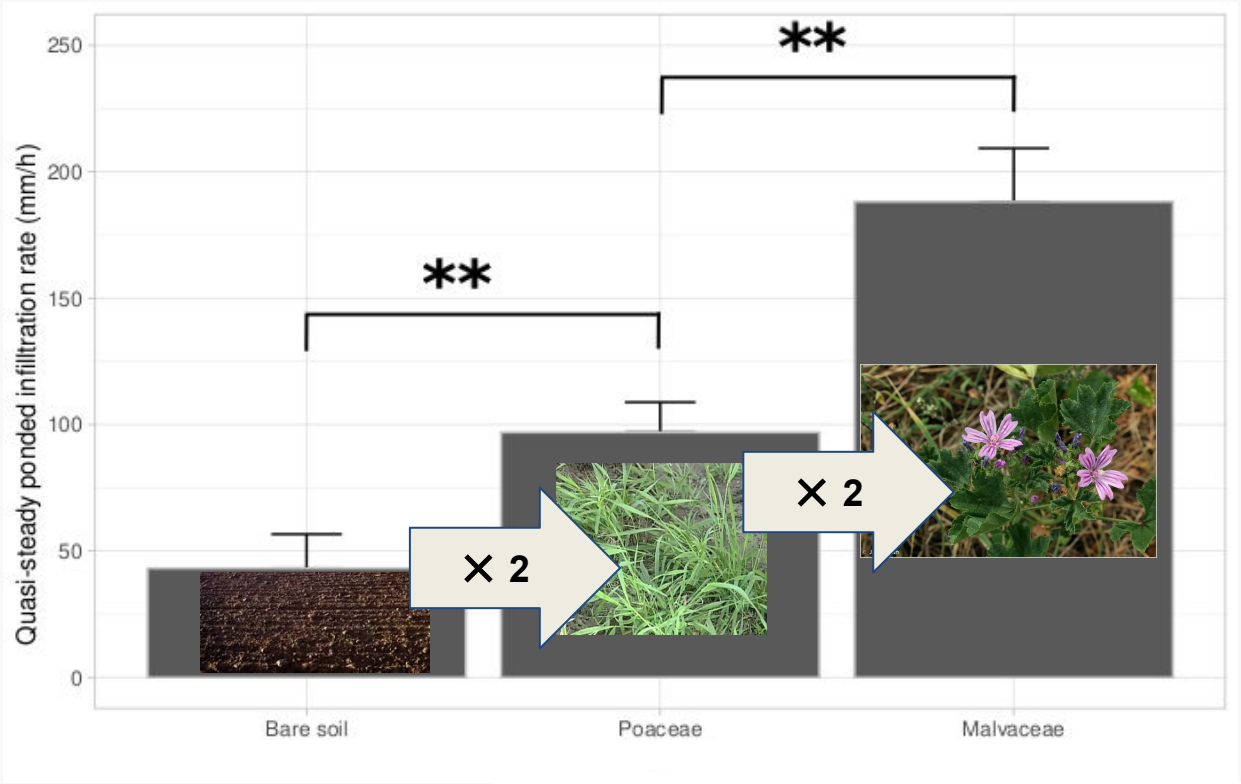
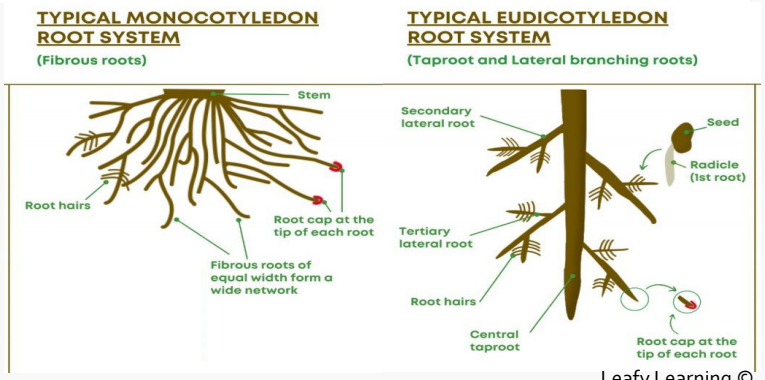
Rapid effect of root system on soil infiltrability





Leafy Learning ©

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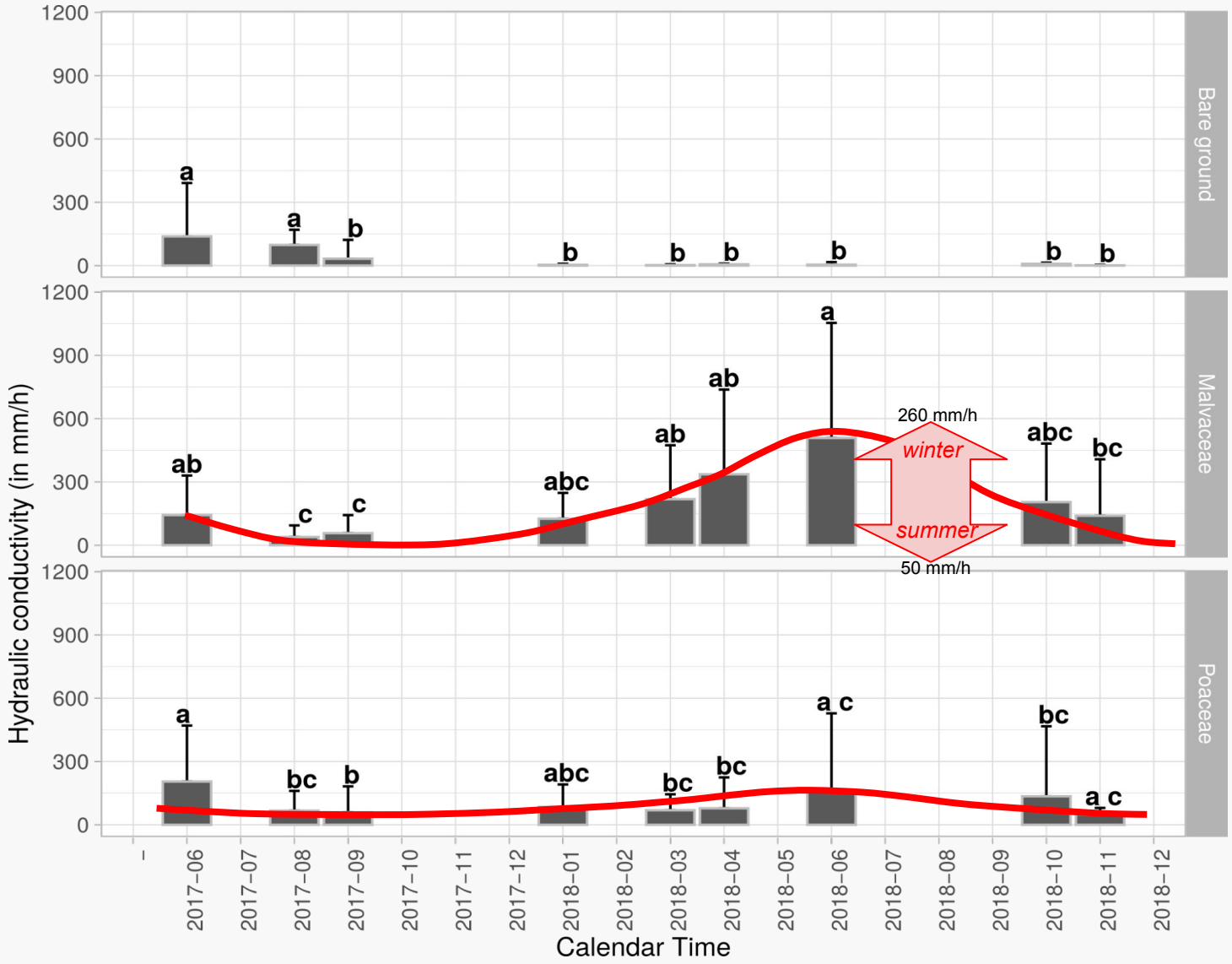
Seasonal variation of soil infiltrability



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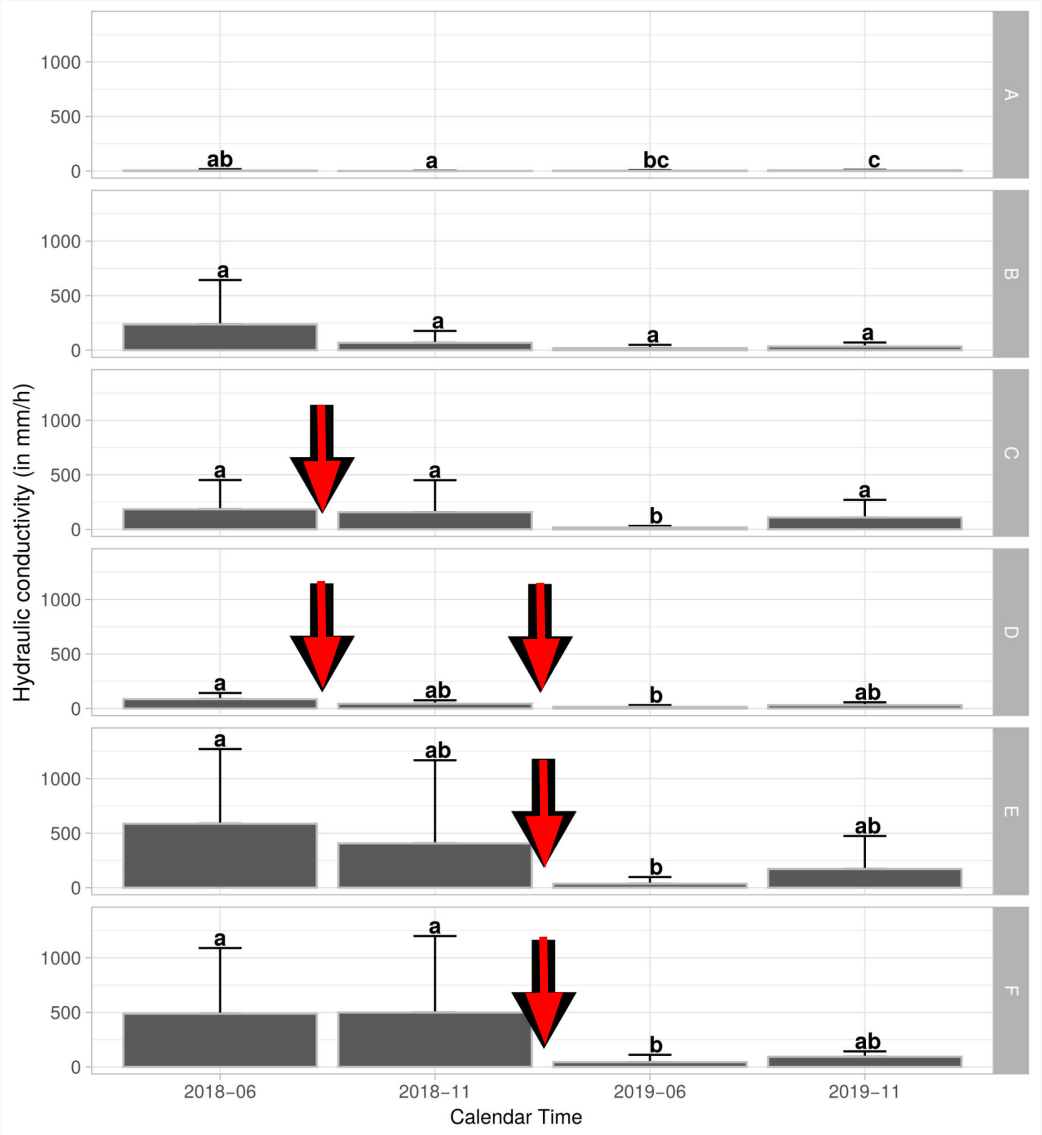
Minor vegetation management effect at short term



bare soil

control

burning

mowing x 2

mowing x 1

chemical weeding

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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

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Dynamics of quasi-steady ponded infiltration under contrasting plant cover and management strategies