



ENVIRONMENTAL DRIVERS OF LITTER DECOMPOSITION IN MEDITERRANEAN PONDS



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Grant PID2020-114440GB-I00 funded by:



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Introduction:

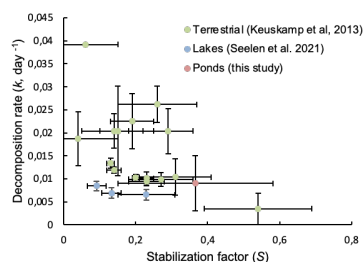
Ponds play an important role in the process of plant litter decomposition, contributing to the carbon cycle. Mediterranean ponds are highly vulnerable to pollution and climate change, which can affect decomposition.

The aim of this project was to quantify the potential for microbial litter **decomposition rate** in Mediterranean ponds, to identify the main drivers of its variability, and to predict changes in litter decomposition under global change by using the Tea Bag Index (TBI), defined by the different decomposition of a labile tea (green tea) and a recalcitrant tea (rooibos).

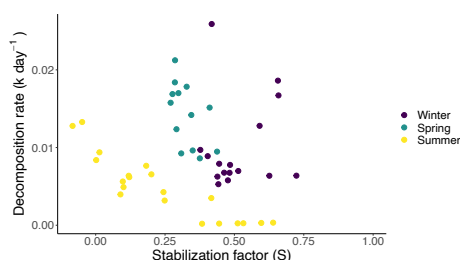
Objectives:

1. Test the **variability** of the decomposition rate in a range of Mediterranean ponds.
2. Investigate the effect of **hydroperiod**, **land use** and **seasonality** in decomposition rate.

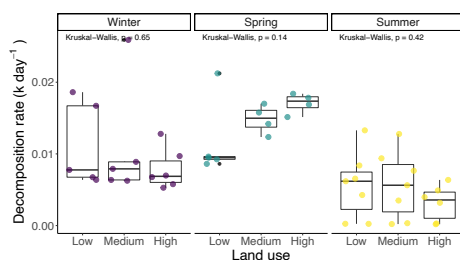
Results and discussion:



Position of our data together with previous TBI results from aquatic and terrestrial ecosystems. Our results are similar to lakes but with higher stabilisation factor (S).

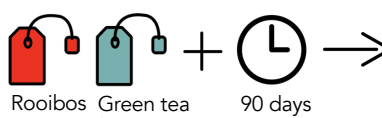


A large variability in the relationship between the *k* (decomposition rate) and the *S* (stabilisation factor) is observed in the different ponds.

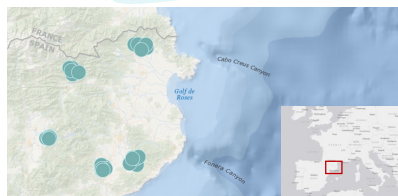


The classification of land use, based in human activity, does not seem to affect the decomposition rate (*k*).

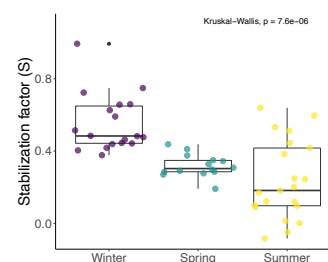
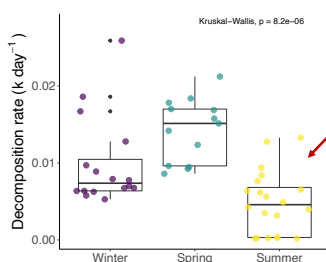
Materials and methods:



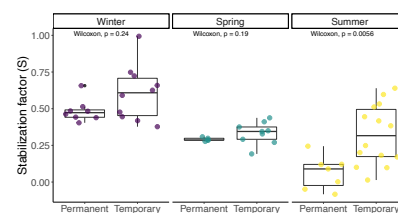
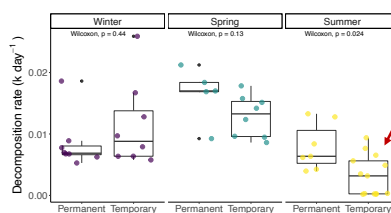
k (**decomposition rate**)
S (**stabilization factor**) refers to the inhibiting effect of environmental conditions on the decomposition. High values indicate increase carbon sequestration potential.



30 ponds were selected to represent 5 different Mediterranean pondscapes according to **hydroperiod** (temporary or permanent) and **land use** (low, medium or high). **Seasonality** (winter, spring and summer) was taken into account.



Decomposition rate (*k*) (left) is lower in summer and winter and higher in spring. Stabilization factor (*S*) (right) is higher in winter and summer and lower in spring.



Differences between temporary and permanent ponds occur only in summer, when temporary ponds have a low *k* (decomposition rate) (left) and a high carbon sequestration potential.

Conclusions:

1. The Tea Bag Index shows a high variability, demonstrating the discriminatory potential of the TBI in different ponds.
2. The results show that the decomposition rate is lower in summer due to the lowest *k* values in the temporary ponds.
3. In permanent ponds, *S* values indicate that major carbon sequestration occurs during winter while the lowest sequestration occurs in summer.
4. The preliminary land use classification of ponds was not found to be a determining factor for the decomposition rate.

References:

