

# LINKING FUEL MOISTURE WITH PLANT PHYSIOLOGY:

Coupling a water balance model with a LFMC model to predict species-specific LFMC values.

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## INTRODUCTION

Live Fuel Moisture Content (LFMC) is a critical determinant of forest flammability and thus fire behavior and severity in many ecosystems. Considering the limitations of current approaches (satellite remote sensing and drought indices) to estimate LFMC, we seek to estimate LFMC in a way that allows to obtain species-specific values and make future predictions

## METHODS

To predict species-specific LFMC, we couple Medfate (1), a water balance model which uses meteorological, edaphic and forest inventory data to predict soil moisture dynamics, with Nolan et al., (2) model which estimates LFMC from leaf water potential ( $\Psi_{\text{leaf}}$ ).



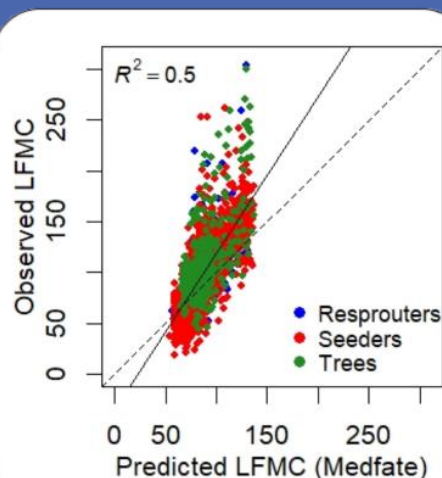
In all, we have analyzed more than 2500 LFMC data from 46 different species in 40 sites of the Iberian Peninsula.

Predicted LFMC values were calibrated and validated using field data from an independent LFMC data base (3). Finally, we estimate for the same study sites the drought code index (DC) and the normalized difference vegetation index (NDVI) with the aim of compare the predictive capabilities of the three approaches.

## RESULTS

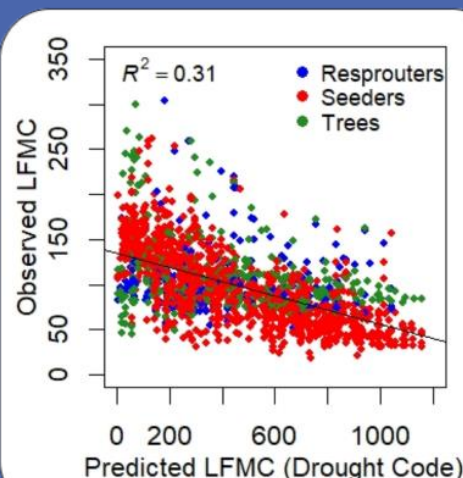
### MEDFATE

All:  $R^2 = 0.5$   
Trees:  $R^2 = 0.41$   
Seeders:  $R^2 = 0.57$   
Resprouter:  $R^2 = 0.3$



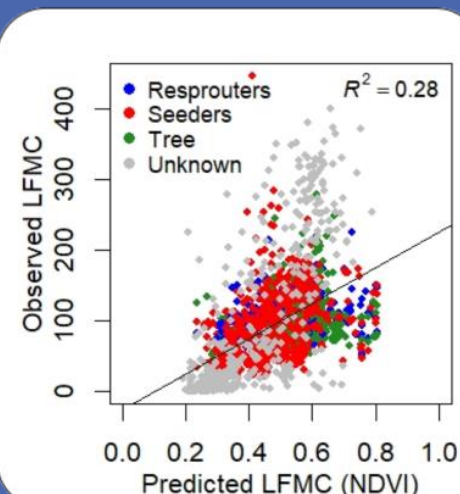
### DROUGHT CODE

All:  $R^2 = 0.31$   
Trees:  $R^2 = 0.09$   
Seeders:  $R^2 = 0.5$   
Resprouter:  $R^2 = 0.005$



### NDVI

All:  $R^2 = 0.28$   
Trees:  $R^2 = 0.06$   
Seeders:  $R^2 = 0.13$   
Resprouter:  $R^2 = 0.03$



**In conclusion we have linked fuel moisture with plant physiology to estimate LFMC values in a way that allow to obtain species-specific values and make future predictions.**