PROPUESTA TFM CURSO 2020-2021

Plant cover, land management and tree mortality relationships in Andalusian declined holm oak dehesas.

Summary:

The loss of trees in holm oak dehesas is currently a major threat for the sustainability of these ecosystems. Although it is considered that the pathogenic soilborne oomycete *Phytophthora cinnamomi* is the main cause triggering tree death in Iberian Penisnula dehesas, climatic conditions (temperature, SPEI, precipitation), soil characteristics (pH and organic material) and other environmental drivers have been related with mortality trends using data of the forest health monitoring network SEDA. Management practices (e.g. ploughing and thinning) have been also identified as key drivers influencing the dispersal of *P. cinnamomi* and oak decline (Hernández-Lambraño et al., 2018). These practices will have a critical effect on both aboveground and belowground diversity and structure. However, their specific effect on dehesa health and *P. cinnamomi* development is uncertain. Furthermore, all mentioned factors might interact ultimately driving the system resilience and therefore tree mortality.
The current student project will try to disentangle one of the key aspects mentioned about dehesa resilience, focusing on the relationship of vegetation structure and tree defoliation and mortality. The combination of the forest health monitoring network SEDA data and remote sensing offers the opportunity to assess this relationship at regional scale in Andalusian dehesas. Vegetation indices, canopy layer analysis and in-field information about plots could provide an accurate dataset about the land occupation and plant structure. We expect that the analysis of the relationship between these data and mortality trends at spatio-temporal scale would provide valuable information for sustainable dehesa management. Students with interest in remote sensing and modelling are encouraged to contact us. Proficiency in reading and writing in English is recommended but not compulsory.

Objectives:

The main objective of this work will be analysing and modelling the relationship between dehesas management, plant cover structure and tree mortality in declined dehesas using data of the SEDA network and remote sensing vegetation analysis techniques.

References:

Hernández-Lambraño, R.E., González-Moreno, P., Sánchez-Agudo, J.Á., 2018. Environmental factors associated with the spatial distribution of invasive plant pathogens in the Iberian Peninsula: The case of Phytophthora cinnamomi Rands. Forest Ecology and Management 419–420, 101–109. https://doi.org/10.1016/j.foreco.2018.03.026
Navarro-Cerrillo, R.M., Varo-Martínez, M.Á., Acosta, C., Palacios Rodriguez, G., Sánchez-Cuesta, R., Ruiz Gómez, F.J., 2019. Integration of WorldView-2 and airborne laser scanning data to classify defoliation levels in Quercus ilex L. Dehesas affected by root rot mortality: Management implications. Forest Ecology and Management 451, 117564. https://doi.org/10.1016/j.foreco.2019.117564

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