POSTDOCTORAL POSITION OFFER FORM

1. Job Position title: Remote monitoring Verticillium wilt of Olive with Sentinel-2 for an efficient biological control

2. Keywords: biological control agents, space aerial vehicles, unnamed aerial vehicles, *Verticillium dahliae*

3. Researcher in charge in DAUCO:

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4. Research Group description (max. 2.000 characters)

The activity of the group, led by the full professor Antonio J. Trapero Casas, has been focused for the lasts 20 years on basic and applied research at field on plant disease in different cultivated and forest species. Main research lines have addressed aspects of Etiology, Epidemiology and Control of extensive Mediterranean herbaceous and woody crops (olive, almond, pistachio, walnut, wheat, vine, etc.) and forest masses (Quercus spp, chestnut, pine, etc.) in the central-western area of the southern Spain.

The group supports also a Diagnostic and Technical Advisory Service on Phytopathology that offer to the sector works of disease diagnose, and pathogen identification using classical (microbiological) and molecular techniques of detection as well as, offering analyses and solutions to epidemiology and control problems (pathogen quantification, evaluation of genetic sources for resistance, evaluations of chemical and biological treatments and formulations).

One of the main research lines of the group during the last two decades have been the implementation of decision support systems and integrated methods for the control of the most important aerial (peacock spot and anthracnose) and soil (Verticillium wilt) diseases of olive, that have made the group stand out as an international reference in the field of crop protection.

In this frame, the Research Group AGR-216 is currently optimizing, through the INNOLIVAR pre-commercial public purchase project (line 8 'Pre-commercial formulations of antagonist microorganisms for the control of VWO'), protocols for the design, development, prototyping and series of product tests that allow the use of soil antagonist micro-organisms for the biological, sustainable and effective control of Verticillium wilt of olive. At the same time, new modes of action of agents and biological products are being evaluated for the control of this disease, different from those evaluated in INNOLIVAR, as well as the efficacy of various foliar application products, such as biostimulants or fertilizers. These researches are being consolidated trough the completion of a doctoral thesis financed with an FPI predoctoral grant and linked to the AGL2016-76240-R project, and several End-of-Degree and End-of-Master Projects.

5. Job position description (max. 2.000 characters)

The primary research project of the applicant for this position will investigate overlaps between Integrated Pest Management in olive groves (which asks: Are biotic crop stresses detected timely enough?) and remote sensing (To what extents physiological and structural hyperspectral and Sentinel-2 indices are indicators of the stress-outbreaks in olive orchards?) in the context of the biological control. Her/his research will evaluate the role of space monitoring projects in the early detection and quantification of the biotic stress causes by the soil-borne fungus *Verticillium dahliae* in large areas of olive groves for an efficient application of biological control agents (BCA), through the integrated use of sensors embedded in unmanned (UAV) and space (SAV) aerial platforms, such as Sentinel 2.

We are looking for a highly motivated postdoctoral researcher with an interdisciplinary expertise in the areas of Remote sensing and Plant pathology, including Big Data analysis and Artificial Intelligence applied to modelling and optimization of early detection of biotic and abiotic stresses in olive trees. It is strongly recommended that the candidate is able to function adequately in all aspects related to the agronomy of olive cultivation. Moreover, He/She must have experience in applied research at field conditions (long-term experiments), in experimental design, and in the statistical evaluation of the results. Therefore, successful applicant should have a PhD degree in plant pathology, and she/he must have demonstrated skills and experience in the implementation of different methodologies within an integrated disease management strategy to mitigate VWO and *V. dahliae*-life cycle modelling, computer programming (mainly with R and Python), geographical information systems (e.g., QGIS) and experience on digital transformation data using hyperspectral sensors on-board UAVs.

It is also required some skills in the implementation of variable selection methods based on Partial Least Square and extensive knowledge in fuzzy logic and other machine learning methods.

Scientific communication (including paper and report writing) and experience of working with private companies towards to patent formulations based on BCA in agriculture will be highly valued.

Fdo: Francisco Javier López Escudero