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MEDIA RELEASE

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DETECTING AGRICULTURAL DISEASE BEFORE VISIBLE SYMPTOMS: Advanced Imaging Technology Needs Backing of Algorithms

Billions of dollars of agricultural losses due to pests and diseases could be saved with a move to include the use of algorithms to improve outputs from high-spectral resolution remote sensing technologies. This offers the best chance of solving what is arguably the greatest disease threat to food security and agricultural productivity worldwide.

This will be explained by a world expert on precision agriculture, Professor Pablo Zarco-Tejada, Professor in Remote Sensing & Precision Agriculture, School of Agriculture and Food & Faculty of Engineering and Information Technology, The University of Melbourne at the Crawford Fund's international conference titled *Food & Nutrition Security – The Biosecurity, Health, Trade Nexus*, in Canberra and online on 13-14 December.

"While the world currently battles the COVID-19 pandemic, agriculture faces the potential for its own global pandemic with *Xylella fastidiosa* - currently the major transboundary plant pest, the number one threat for Australian agriculture, and the world's most damaging pathogen in terms of socio-economic impact," said Professor Zarco-Tejada.

"Progress in the last 20 years in airborne-, space- and drone-based imaging has advanced tremendously. These innovations have allowed improved large-scale monitoring of crops with unprecedented detail by using advanced cameras and technological imaging devices able to scale down to the *"sub-nanometer"* resolution, so we can detect disease before symptoms are visible."

"We need to go one step further and give this level of imaging the boost of a novel algorithm based on physical models and machine learning to increase detection to up to 92% accuracy," explained Professor Zarco-Tejada who heads the Hyperspectral Remote Sensing & Precision Agriculture Laboratory. The Lab has two hyperspectral imagers and a thermal camera, and can scan thousands of hectares and generate images where every single tree is included.

"Global warming and international trade are increasing biosecurity risks to agriculture. By engaging agriculture and engineering we can work at a much larger scale and with greater precision to further advance the early detection of devastating pathogens and reduce billions of losses worldwide," said Professor Zarco-Tejada, whose work in Europe was focused around olive and almond groves but has moved to adapting and improving the remote sensing detection algorithms for *Xylella fastidiosa* in the Australian context as part of preparedness programs funded by the Department of Agriculture, Water and Environment.

The Fund's annual conference will bring together international and Australian specialists to identify current key threats and showcase where Australia and partners have had success.

The conference will have specialists addressing key threats and work at home and in neighbouring countries including on Fall Army Worm, African Swine Fever, Foot and Mouth Disease, antimicrobial resistance and cereal rusts.

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