PhD Thesis Defense

On **Tuesday February 25th 2025 at 3.00 pm**, in the classroom **G**, Via Santa Sofia 100

Salvatore Privitera (XXXVII cycle)

Will discuss his PhD theses titled

Double Degree
UNICT- UFV

Doctor
Europaeus
Candidate

NOZZLE SPRAY QUALITY AND SPRAY DEPOSITION IN AGRICULTURAL TREATMENTS

Thesis Abstract

Within the current scenario of agriculture, Plant Protection Products (PPPs) have been recognized as one of the most effective and powerful tools for crop pest control, offering several benefits in controlling plant growth. However, improper handling of these products can inevitably lead to undesirable impacts on both human health and the surrounding environment. For this reason, it is required paying attention to several aspects during PPP application process, which will determine how effectively the crops are covered by the liquid mixture. Among these, the assessment of nozzle spray quality, evaluated in terms of droplet size spectrum, holds a significant role, as it has influence on the movement of the required dose to the target, on the unwanted off-target losses, as well as on the operator safety. In this context, the multidisciplinary research activities of this PhD thesis were focused on: (i) taking general understanding and reviewing the current available scientific literature regarding the most widespread techniques, both intrusive and non-intrusive, for droplet size measurement; (ii) evaluating the effects of image segmentation thresholding on droplet size measurement; (iii) comparing the performance of four droplet size measurements techniques employed for spray characterization, by measuring the droplet size spectrum produced by agricultural nozzles under identical operating conditions; (iv) studying the correlation between droplet diameters, foliar deposition on orange leaves and surface coverage measured on Water Sensitive Papers (WSPs) under laboratory conditions, so that allowing the development of a model capable of predicting foliar deposition in function of superficial coverage and droplet characteristic diameters; and (v) modelling the cumulative volume curves by using the logistic function, allowing to compute and forecast the volumetric diameters in a spray, as well as evaluate the effect of spray pressure on the model. Overall, the present research project has contributed to lay a valid base for an efficient PPP application, playing a fundamental role in increasing their benefits and driving farmers and researchers to better consolidate the state of knowledge about the optimal droplet size distribution and the resulting efficiency of the spray deposition process during phytosanitary treatments.

Advisors: Co-advisor:
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