

Epidemiological Model for Citrus Black Spot Dynamics along the Pre-Harvest Supply Chain

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Abstract : Citrus Black Spot (CBS) is a fungal disease that is responsible for huge economical loss and poses a threat to the citrus industry worldwide. We construct a mathematical model framework for citrus black spot between fruits to characterise the dynamics of the disease development, paying attention to the pathogen life cycle. We have made an observation from the model analysis that the initial inoculum from ascomata is very important for disease development and thereafter it is no longer important due to conidia which is responsible for secondary infection. Most importantly, the model indicated that ascospores and conidia are very important parameters in developing citrus black spot within a short distance. The basic reproductive number and its importance in relation to citrus black spot persistence are outlined. A numerical simulation of the model was done to explain the theoretical findings.

Keywords : epidemiological modelling, *Guidnardia citricarpa*, life cycle stage, fungal, disease development

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