

Title: A compartmental epidemiological model for brown rot spreading in stone fruits orchard.

Authors

Daniele Bevacqua¹, Michel Génard¹, Bénédicte Turion-Quilot¹, Leandro Oliveira Lino¹, Vincent Mercier², Francoise Lescourret¹

Institutions

¹ INRA, Avignon, France; ²INRA, Gothenburg, France

Abstract (max 300 words):

Brown rot is one of the main polycyclic diseases in stone fruits and in absence of chemical treatments and presence of favorable environmental conditions it can decimate peach crops. A better understanding of the mechanisms underlying its spreading in orchards is therefore mandatory to promote a reduction in the use of pesticides and adapt agronomic practices to possible climate change scenarios. We developed a simple ordinary differential equation model to describe temporal dynamics of brown rot spreading in a fruit tree orchard. We parametrized the model by using field and laboratory data gathered in 2014 and 2015 from a peach (*Prunus persica*) orchard at Avignon (southern France). Data show temporal trajectory of fruit status (i.e. resistant, susceptible, infected) and size and of pathogen densities. Comparisons with empirical evidence show that the simulated dynamics are consistent with reality. We eventually used the model to study epidemiological consequences of cultural practices such as fruit thinning and fertilization.