

# Long-distance Dispersal and its Implication for Late Blight Management in Continuous and Non-continuous Potato Production Systems.

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One important difference between potato (*Solanum tuberosum* L.) production systems in temperate and tropical regions is the potential for continuous production in some parts of the tropics. Late blight, caused by *Phytophthora infestans*, poses a threat to potato crops in both systems, though the nature of epidemics may differ between continuous and non-continuous systems. The disease is easily disseminated through airborne sporangia and, because inoculum dynamics strongly influence the onset of disease and increases in disease severity, the potentially greater levels of early season inoculum in continuous production systems may have important implications for management of late blight. We will describe a statistical test to determine how heavy the inoculum load is, based on the spatial pattern of disease in a particular field.

Continuous and non-continuous production systems can be viewed as distinct ecosystems, each having its own *genius epidemicus*. Long-distance dispersal events are likely to affect late blight epidemics differently in continuous and non-continuous potato production systems. In addition, the number of potential potato crops per year, inoculum availability during the year, and inoculum overwintering differ greatly between the two systems.

Research has been conducted in both production systems to gain a better understanding of these complex interactions. Experiments were designed to determine whether long-distance dispersal is equally important for epidemics in both types of production systems and what the importance of long-distance dispersal may be for late blight management. Results of current investigations will be presented and discussed. Despite advances in our understanding, we still lack information about many aspects of long-distance dispersal. It would be very useful to have more data related to the quantification of sporangia production at a source area; the effects of wind speed, plant phenology, and disease intensity on sporangia removal from the potato canopy; the effect of rain on sporangia production, release, and wash-out from the atmosphere during transport; the relationship between cloudiness and sporangia survivability; the physical properties of the sporangium such as aerodynamics, impaction and deposition efficiency, and the infection frequency of deposited sporangia. Knowledge about long-distance dispersal events can be incorporated into models in decision support systems for managing late blight. We hope this new information will benefit potato growers and consumers.

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