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## GEOSIMCast Model: An Empirical Approach in Cundinamarca, Colombia

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### Abstract

The oomycete *Phytophthora infestans* is the cause of Late Blight, which is considered the most important disease worldwide in potato fields. In most cases, potato production relies on frequent fungicide spraying which rises production costs for farmers in emerging countries, being the main cause of crop abandonment. This study describes the climatic conditions of infected potato crops in Cundinamarca (Colombia) and this study helps to calibrate, standardize and validate the GEOSIMCast model for this region. Colombia is the third potato producer in Latin America, therefore, the results of this research contribute to the understanding of how climatic factors influence the biological cycle of this pathogen in potato fields in different parts of the country. The trial was conducted in eight commercial potato fields in three municipalities of Cundinamarca. Fertilisation and non-experimental fungicides and pesticides were applied according to the standard agricultural practices in the region. Fields were planted with different potato varieties (common called R-12, Criolla and Suprema), which have different level of response to the disease. The sampling for the disease began at the emergence of the crop in each field and lesions were collected to estimate the number of sporangia and the proportion of the lesion in the leaf. Climate data were taken from a weather stations database provided by IDEAM (Instituto Hidrología, Meteorología y Estudios Ambientales de Colombia). Daily climatic data of those stations were interpolated in order to be able to apply the GEOSIMCast model, and the result of the modelling is a fungicide calendar map (risk map). Furthermore, the SIMCAST model (which it is included in the GEOSIMCast model) generates AUDPC graphics, which estimate the late blight progress in potato fields, during the growth stages of the potato crop. These graphics help us to compare the quality of the model predictions and the actual severity of the disease based on the AUDPC graphics created from our sampling.

**Keywords:** Climate, GEOSIMCAST, late blight, *Phytophthora infestans*, potato varieties