A decision support system for late blight of tomato

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A web-based decision support system (DSS) for tomato and potato late blight, caused by *Phytophthora infestans*, has been developed which links several models into a system that can be used to predict disease dynamics based on weather conditions and management tactics. The system was initially developed for late blight of potato but extension of the system is underway to enable its use for late blight of tomato. Location specific, observed and forecast, weather data are used by the DSS to drive disease forecast models, including Blitecast and Simcast. Additionally, the DSS utilizes a simulation model, LATEBLIGHT (LB2004 version), to provide a prediction of disease development up to seven days into the future as a function of future weather and future fungicide selected by the user. This simulator provides researchers and educators with a tool to evaluate disease management scenarios, conduct sensitivity analysis of resistance components, explore comparative epidemiology, develop forecasting models, or function as a teaching aid.

A late-blight dispersal-risk algorithm capable of determining favorability of weather conditions for sporulation, dispersal and survival of spores, and subsequent infection of host tissue has been developed for the DSS. The influence of weather conditions on these processes was obtained from published and unpublished data. The algorithm uses temperature, relative humidity, wind speed and direction, as well as solar radiation. Historic (observed) data as well as forecast data are used. For each potential risk period independent indices are calculated for sporulation, dispersal (at the source site) and survival of sporangia in transit, as well as for subsequent infection of host tissue at the target site. Proximity of the target to an inoculum source (if present) may be utilized in the risk index at the discretion of the user. These indices are then integrated to provide an overall risk index. Because the algorithm uses future weather as well as historical weather, it enables users to take precautionary measures. Preliminary experiments suggest that forecast “high risk” periods could be used to enhance the efficiency of disease management practices. The Decision Support System is structured to enable the communication of “inoculation alerts” to users.

The DSS provides an interactive system that helps users maximize the efficiency of their crop protection strategy by enabling well-informed decisions.