

Modifying a Decision Support System to provide a more accurate representation of moderately susceptible cultivars.

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A decision support system (DSS) for potato and tomato late blight management has been developed to predict disease and fungicide residue dynamics, based on local weather data, cultivar resistance, and fungicide use. The DSS collects weather data from nearby weather stations and conveys those data to two disease forecasting tools, Blitecast and Simcast, in order to provide recommendations for the timing of fungicide applications. The Simcast forecast system functions by calculating blight units and fungicide units, which reflects the influence of prevailing weather on the disease and fungicide residue. If the accumulated blight units or fungicide units reach a critical threshold a fungicide application is recommended to the user. Results from simulation and field experiments with the system have shown that the DSS can improve disease suppression for susceptible crops and moderately resistant crops relative to a weekly fungicide application schedule. However, results with the DSS schedules on moderately susceptible crops did not achieve sufficient disease suppression under certain circumstances. The primary objective of this research was to improve disease suppression for moderately susceptible cultivars while maximizing fungicide use efficiency. This was done by modifying blight unit and fungicide unit thresholds for moderately susceptible cultivars. We analyzed simulated experiments using weather data from 114 locations in five states (MA, ME, ND, NY, WI) over 11 years for a total of 962 location-years, conducting 31,936 simulation “experiments”. As result, the threshold values for the moderately susceptible cultivars was optimized (to achieve adequate disease suppression and maximum fungicide use efficiency) at 35 Blight Units and -17 Fungicide Units. This change has subsequently been programmed into the on-line version of the DSS.

