Weather Conditions Conducive for the Early-Season Production and Dispersal of *Cercospora beticola* Spores in the Great Lakes Region of North America

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ABSTRACT
In many parts of the world including the Great Lakes region of North America, Cercospora leaf spot (CLS), caused by the fungal pathogen *Cercospora beticola*, is a major foliar disease of sugar beet (*Beta vulgaris*). Management of CLS involves an integrated approach which includes the application of fungicides. To guide fungicide application timings, disease prediction models are widely used by sugar beet growers in North America. While these models have generally worked well, they have not included information about pathogen presence. Thus, incorporating spore production and dispersal could make them more effective. The current study used sentinel beets to assess the presence of *C. beticola* spores in the environment early in the 2017 and 2018 growing seasons. Weather variables including air temperature, relative humidity, rainfall, leaf wetness, wind speed, and solar radiation were collected. These data were used to identify environmental variables that correlated with spore levels during a time when CLS is not generally observed in commercial fields. *C. beticola* spores were detected during mid-April both years, which is much earlier than previously reported. A correlation was found between spore data and all the weather variables examined during at least one of the two years, except for air temperature. In both years, spore presence was significantly correlated with rainfall ($P < 0.0001$) as well as relative humidity ($P < 0.0090$). Rainfall was particularly intriguing, with an adjusted R2 of 0.3135 in 2017 and 0.1652 in 2018. Efforts are ongoing to investigate information on spore presence to improve prediction models and CLS management.

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