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THE INTERACTION OF FUNGICIDE RESISTANCE AND VARIETY RESISTANCE

ABSTRACT

Management of Cercospora leaf spot (CLS) relies in part on using a sugar beet variety with good resistance to CLS; in the northcentral area of the USA we recommend a KWS rating of < 5.0. Our previous work demonstrated significantly reduced disease control in susceptible sugar beet varieties inoculated with *C. beticola* isolates with EC_{50} values >1 µg/ml and treated with tetraconazole in greenhouse trials. The objective of this research is to determine if similar reduced disease control occurs with CLS resistant varieties. Plants of a CLS susceptible and a CLS resistant sugar beet variety were grown in the greenhouse, sprayed with field-strength tetraconazole (Eminent) or water and inoculated with mixtures of *C. beticola* isolate groups from sensitive to highly resistant. Plants were incubated hot and humid for three days and evaluated for disease by counting CLS spots four weeks later. *C. beticola* caused significantly more disease on susceptible varieties compared to resistant varieties on plants without tetraconazole, but there is no difference in disease between susceptible or resistant varieties treated with tetraconazole across all isolates. Disease is significantly reduced when tetraconazole is present compared to no fungicide. *C. beticola* isolates with EC_{50} values of 10 µg/ml or greater cause more disease than isolates with EC_{50} values of 5 µg/ml or less on both susceptible and resistant sugar beet varieties without tetraconazole, but EC_{50} values >10 µg/ml are necessary to reduce disease control in resistant varieties when treated with tetraconazole. It appears that isolates with EC_{50} value of >10 µg/ml can overcome variety resistance. *C. beticola* isolates with EC_{50} value >10 µg/ml have been identified in the EU and USA in recent years. It will continue to be important to develop sugar beet varieties with high levels of resistance to CLS.