

## MOLECULAR BASIS OF FUNGICIDE RESISTANCE IN *CERCOSPORA BETICOLA*

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*Cercospora* leaf spot (CLS), caused by the fungus *Cercospora beticola*, is the most important foliar disease of sugarbeet. Control measures include the application of sterol demethylation inhibitor (DMI) and quinone outside inhibitor (QoI) fungicides. Understanding the molecular mechanism of fungicide resistance is critical for fungicide resistance management. To gain an understanding of the molecular basis of DMI resistance, we cloned the *C. beticola* *Cyp51* gene, which encodes the DMI target Cyp51. Resistance to DMIs was shown to be related to over-expression of *Cyp51*. The gene encoding the mitochondrial QoI-target enzyme cytochrome b was cloned. All resistant isolates harbored a G143A mutation in cytochrome b. A probe was designed to specifically amplify and differentiate both alleles of the gene. The use of this probe was shown to vastly increase throughput of fungicide sensitivity testing. Isolates harboring the G143A mutation have now been found in many sugarbeet growing regions around the world. Sensitivity testing and concomitant fungicide resistance management programs will be necessary to ensure efficacy of fungicides for CLS control.