



84-P: The role of heteroplasmy for the cytochrome b gene in resistance to Qo fungicides in *Podosphaera xanthii*.

Tuesday, July 31, 2018

16:00 - 16:00

Powdery mildew elicited by *Podosphaera xanthii* is a devastating disease of cucurbits worldwide and one of the most important diseases affecting these crops in Spain. Application of fungicides is the main control practice in most cucurbit crops for managing powdery mildew. The quinone outside inhibitors (Qo) represent an important class of agricultural fungicides, which are widely used in Spain against the powdery mildew disease. Qo have a single-site mode of action inhibiting mitochondrial respiration by binding to the Qo site of the cytochrome bc_1 enzyme complex, thus blocking electron transfer in the respiration pathway and leading to an energy deficiency due to a lack of ATP. In a previous report, widespread resistance to Qo fungicides in populations of *P. xanthii* in South central Spain was documented, but the molecular mechanisms of resistance remained unclear. In this work, the role of cytochrome *b* (*cytb*) gene mutations in Qo resistance of *P. xanthii* was examined. Sequence analysis of a cloned fragment of *cytb* revealed the presence of a G143A substitution that occurs in many Qo-resistant fungi. This mutation was always detected in Qo-resistant isolates of *P. xanthii*; however, it was also detected in sensitive isolates. To better understand the role of heteroplasmy for *cytb* in Qo resistance of *P. xanthii*, an allele-specific quantitative polymerase chain reaction was developed to quantify the relative abundance of the A143 (resistant) allele. Our data suggest that G143A mutation in *cytb* is the primary factor involved in Qo resistance of *P. xanthii*; however, the proportion of G143 and A143 alleles in an isolate may determine its Qo resistance level. In addition, the role of the Rieske-FeS protein (ISP), the other protein component of the Qo site, in Qo resistance was also examined.

Funded by: AGL2016-76216-C2-1-R

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