Azoxystrobin sensitivity of *Rhizoctonia solani* AG2-2 populations affecting Michigan sugar beet

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Summary: From 2018-2019, *Rhizoctonia solani* primarily AG 2-2 isolates were tested for sensitivity to azoxystrobin. In Michigan, azoxystrobin (Quadris) is widely applied one to two times per season to manage Rhizoctonia root and crown rot. Azoxystrobin, a quinone outside inhibitor, targets a single site to inhibit fungal respiration and so possesses a high risk of fungicide resistance development. Continued reliance on this product has justified recent investigations of azoxystrobin sensitivity in Michigan *R. solani* populations. Isolates were collected from research and commercial fields in Michigan (10 counties). Two additional baseline isolates (R1 and R9), collected prior to azoxystrobin use in sugar beet, were included for comparison. Isolates were screened in half-strength clarified V8 broth amended with salicylhydroxamic acid at 10 µg ml^{-1} and azoxystrobin at concentrations: 0, 0.01, 0.1, 1, 10, and 100 µg ml^{-1}. The effective concentrations for 50% inhibition of colony mass (EC_{50}) were determined using three-parameter logistic regression. The majority of tested isolates (more than 95%) were comparable to baseline isolates with EC50 values less than 0.3 ug ml^{-1} (Lunos 2016). Azoxystrobin insensitivity was observed ($N = 3$ isolates), however, pathogen fitness may have been impacted as minimal growth was observed even at low concentrations. No trends in year of collection, host of origin, or county of origin were observed.

Table 1. Mean, standard deviation, minimum, and maximum azoxystrobin EC_{50} values (µg ml^{-1}) for baseline and nonbaseline *Rhizoctonia solani* AG 2-2 isolates tested in 2018 and 2019.

Tested	Collected	Isolate Group	*N*	Mean	St. Dev.	Min.	Max.
2018	Pre-1999	Baseline	2	0.025	0.001	0.025	0.026
	2015-2018	Nonbaseline	37	0.050	0.095	0.012	0.606
2019	Pre-1999	Baseline	2	0.014	0.003	0.012	0.016
	2019	Nonbaseline	49	0.228	0.983	0.005	4.956

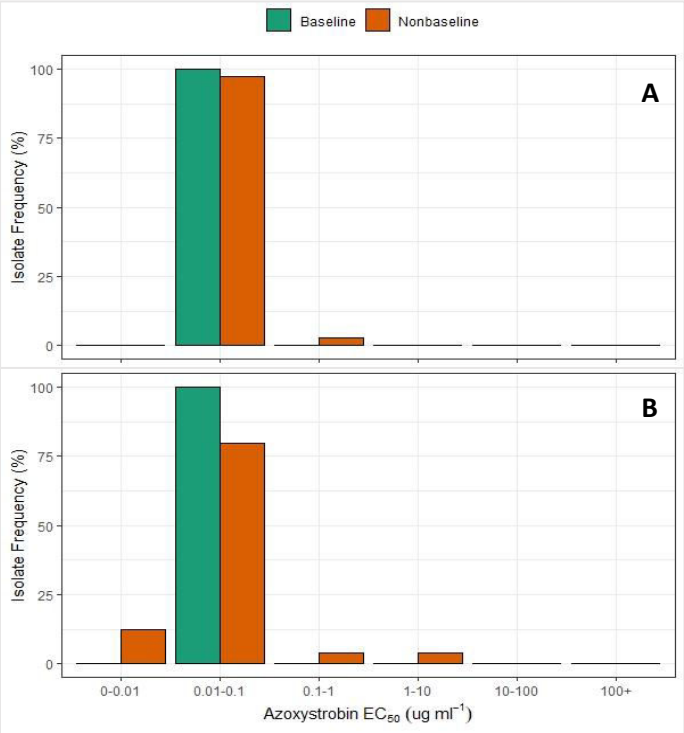

Figure 1 (left). Frequencies of *Rhizoctonia solani* primarily AG 2-2 EC_{50} values (µg ml^{-1}) for baseline isolates collected pre-1999 and nonbaseline isolates collected **A**, between 2015 and 2018 ($N = 37$), and **B**, in 2019 ($N = 49$).

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