

Identification and characterization of fungicide-resistant strains of *Zymoseptoria tritici* in Kentucky

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Zymoseptoria tritici (formerly known as *Septoria tritici*) causes both Septoria leaf blotch of wheat, which is one of the most common foliar diseases observed in Kentucky. When flag leaves are affected by leaf blotch, yield losses generally occur. One of the most common ways to manage this disease is through application of foliar fungicides.

The strobilurin fungicide class is one of the most common fungicide classes applied to wheat and other field crops. This class of fungicides contains active ingredients that control a wide spectrum of diseases but has a high risk of selecting for fungicide-resistant strains of fungal pathogens.

The objective of the proposed research are:

1. Collect isolates of *Z. tritici* throughout Kentucky and evaluate their sensitivity to strobilurin fungicides
2. Characterize the mechanism of *Z. tritici*'s resistance to strobilurin fungicides

Current status of project:

Isolates of *S. tritici* were collected from Kentucky wheat fields in 2020 and grown in culture in the lab. DNA was extracted from each isolate. PCR Primers were used to amplify region of the DNA that encompasses the cytochrome b gene, which is where known mutations occur confer resistance to strobilurin fungicides. The PCR products were sent to a lab for sequencing, and sequences were aligned to look for any known mutations that are known to cause resistance to strobilurin fungicides, which are the F129L, G134A, and G137R mutations. In total, 79 *Z. tritici* isolates were evaluated for these mutations. The G143A mutation was found in 19 out of the 79 isolates evaluated (24.1%) (Table 1). By county, isolates with the G143A mutation ranged from 0% to 50%.

Table 1. Isolates of *Zymoseptoria tritici* with the G143A mutation that confers resistance to strobilurin fungicides collected from Kentucky wheat fields in 2020.

County	No. of isolates evaluated	Isolates with the G143A mutation (%)
Caldwell	9	44.4
Christian	8	50.0
Fayette	2	0.0
Fulton	9	22.2
Graves	9	22.2
Logan	8	25.0
Simpson	7	28.6
Todd	8	12.5
Trigg	8	12.5
Warren	9	11.1
Woodford	2	0.0
<i>All Counties</i>	79	24.1

Preliminary conclusions:

From isolates that have been evaluated so far, approximately 24% of the *Z. tritici* isolates tested from Kentucky are resistant to strobilurin fungicides. These findings likely will have an implication on how Septoria leaf blotch is managed with fungicides, and it highlights the need for additional fungicide chemistries to manage diseases of wheat.