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**Project ID: FY16-BE-028**

**ARS Agreement #: 59-0206-4-006**

**Research Category: MGMT**

**Duration of Award: 1 Year**

**Project Title: Genetic Basis of Triazole Resistance and Detection by Isothermal Assay**

## **PROJECT 2 ABSTRACT**

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The proposed research will identify genetic markers associated with triazole resistance in *Fusarium graminearum*, determine if they are responsible for resistance, and use them to develop a rapid molecular assay for resistance detection. The project is comprised of four objectives: 1) identify mutations associated with triazole resistance, 2) transform sensitive *Fusarium graminearum* strain with possible resistance genes, 3) develop a loop-mediated isothermal amplification (LAMP) reaction that identifies resistance alleles in the field, and 4) foster adoption of the LAMP assay in both the lab and field. Knowledge generated by this study will contribute towards the goals of the USWBSI Management Action Plan (3), and Research Priorities (1, 2). Understanding the genetic basis for triazole resistance will allow tracking of its development in populations, creation of a marker for epidemiological and genetic studies, and further research on resistance to other demethylation inhibitor fungicides. In the immediate future, this will improve our ability to assess *F. graminearum* fungicide resistance in the field and aide in documenting populations that harbor resistance. In the long-term, this information will be useful during development and deployment of new management strategies. The high-throughput DNA based assay will greatly increase the number of isolates screened for resistance and the speed at which surveys are conducted. The high sensitivity of this procedure will make testing composite samples of field isolates as well as direct plant matter possible. The presence of fungicide resistance in an infected kernel of wheat or barley could be confirmed in a matter of hours using this technology. These outcomes will contribute to the mission of the USWBSI, improve management recommendations for growers, and provide researchers with a new tool to study *F. graminearum*.