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Project Title: Developing New SRWW Germplasm with Resistance to Scab.

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PROJECT 1 ABSTRACT

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Scab of wheat is a disease that has recently increased in wheat grown in the U.S. mid-Atlantic. Scab or head blight is caused by fungi of the genus *Fusarium*. Scab reduces grain yield, decreases grain quality, and can produce toxins that are a potential health threat when the infected wheat is used for food. Varieties that are used in this region have only modest levels of resistance and are mostly susceptible to this disease. Therefore, the development of wheat cultivars with enhanced resistance to scab is critical to wheat growers in the Mid-Atlantic. The overall goal of this project is to develop new elite soft red winter wheat germplasm adapted to the mid-Atlantic region with enhanced resistance to scab. To accomplish this goal a set of elite soft red winter wheat genotypes will be crossed with several genotypes containing various types of resistance to scab, concentrating in the introduction of sources that may prove to be different from the Sumai3, which is the most widely used.. Most of the resistant wheat germplasm available does not have the required agronomic and quality characteristics to be used directly in crosses. Therefore extensive backcrossing or multiple crosses will be required to introduce higher levels of resistance while improving the agronomic characteristics of the new germplasm. In addition, special nurseries that are artificially inoculated are required to select for resistance. Molecular marker assisted selection will also be utilized in those crosses where markers have been identified with resistance to accelerate and improve the efficiency of selection (genotyping will be carried out at the USDA at Manhattan (KS)). This proposed research is relevant to the U.S. Wheat and Barley Scab Initiative because publicly available germplasm developed from this project will be useful in the development cultivars with enhanced resistance to scab for the mid-Atlantic region of the U.S.