

0203-MC-107 Winter Wheat Germplasm Introduction and Evaluation.

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PROJECT ABSTRACT

(1 Page Limit)

Fusarium graminearum Schwabe (teleomorph *Gibberella zeae* (Schwein.), (scab) is an increasingly important problem in the north-central region of the United States. Yield losses in Missouri alone have exceeded \$300 million dollars since 1990. Host resistance is considered the most practical and effective means of control but breeding has been hindered by a lack of effective resistance genes and by the complexity of the resistance in identified sources. The identification of different sources of resistance and their incorporation into adapted wheat varieties is critical to the continued improvement of *Fusarium* head blight resistance in winter wheat and is a major objective of the US Wheat and Barley Scab Initiative (USWBSI). We hypothesize that the identification and verification of resistance in lines that are geographically diverse may add new sources of resistance that can be used in breeding programs. By May 2002, we will have completed greenhouse and field evaluations of approximately 3800 accessions from Asia, Brazil, Italy and Eastern Europe. From Asia and Italy, 50 accessions were identified with good levels of type II resistance, low incidence and good kernel quality. Twenty of these accessions have been distributed to collaborating breeders and the remaining 30 will be distributed at the 2002 National Scab Forum in Cincinnati. From among 2000 accessions screened from the Balkans, 148 lines have shown good resistance through 2 cycles of evaluation. These will be re-evaluated in 2001/2002 and where lines continue to show resistance, they will be distributed in the fall of 2002. This proposal seeks to continue evaluation of new accessions including 620 accessions from those originally targeted from Poland, Czechoslovakia, Macedonia, and the Ukraine. It will also verify, purify and increase lines previously identified as having putative resistance genes and distribute these lines to collaborating breeders. In addition, this proposal will facilitate introduction into the US of lines identified through the CIMMYT/ USWBSI partnership. Lines introduced in fall 2002 are anticipated from: China, Romania, Ukraine, Korea, Uruguay, and Argentina. Finally, we will undertake molecular genetic analyses of the genetic diversity in approximately 90 lines representing germplasm (landraces, breeding lines and cultivars) from 8 countries and 4 continents that have been identified as having good broad-based (type I, and type II) resistance and good kernel quality under inoculations. Using AFLP markers, we will screen populations for polymorphisms that should indicate genetic diversity. We hypothesize that accessions that are maximally genetically diverse will have an increased likelihood of containing different resistance genes. This research will provide preliminary data to better select among the many resistant sources identified, accessions for molecular and conventional genetic characterization of the resistance genes they contain.