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PROJECT 1 ABSTRACT
(1 Page Limit)

The overall goal of this project is to characterize and compare populations of the *Fusarium* head blight pathogen (*Fusarium graminearum*) from wheat in the United States, Brazil and Italy employing molecular markers. A similar study of strains from China was completed in the last funding period. Collections of strains from 12 states and contemporary collections from Italy and Brazil have been obtained and are being analyzed. Efforts to characterize and compare these populations involve: 1) examining polymorphic, co-dominant markers in strains from these populations, 2) determining the phylogenetic lineage of all strains, 3) calculating allele frequencies and gene diversities within populations and comparing them among populations, 4) determining gene flow between populations within lineages and 5) determining the level of sexual reproduction within populations. As plant breeders develop new varieties of wheat resistant to *Fusarium* head blight, it will be necessary to determine not only if pathogen populations vary from location to location, but also the potential of individuals within and between populations to exchange genetic material through recombination. Both China (previously examined) and Italy are sources of disease resistant plant germplasm used in U.S. breeding programs; therefore it is imperative to compare pathogen populations from these and other locations to those in the United States. Also, due to the import of breeding materials from these countries it may be crucial to carefully examine the U.S. population to detect possible immigration of novel lineages and/or genotypes and to assess the effect of this potential population admixture.