

PI: Gongshe Hu

PI's E-mail: Gongshe.Hu@ARS.USDA.GOV

Project ID: FY14-WE-003

ARS Agreement #: NA

Research Category: WES-CP

Duration of Award: 1 Year

Project Title: Evaluation of Barley Breeding Lines for FHB Resistance in Controlled Field Nursery in Idaho.

PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium head blight (FHB) disease causes yield loss, low test weights, low seed germination, and contamination of grain with mycotoxins. Therefore, FHB disease is a critical factor affecting barley yield and quality. FHB historically is not a problem in Idaho because of the uniquely dry environmental conditions and lack of FHB inoculums in the barley producing areas of the state. Unfortunately FHB has begun to appear sporadically in Idaho barley fields in past a few years. This occurrence of FHB disease in Idaho barley fields is an alarming signal for possible future production problems in the state. The current sporadic FHB in barley could increase to become a serious epidemic in the future—one that could threaten the supply of high-quality barley for the malting industry. Developing and growing FHB-resistant cultivars is the main approach to reduce this threat. Evaluation of FHB resistance in the breeding program is of fundamental importance in identifying new resistance resource and elite breeding lines with FHB resistance.

The specific objective in the first year is to carry out the pilot experiments in evaluating elite breeding lines for FHB resistance in a local FHB screening nursery under the proposal of the Co-Investigators, Dr. Juliet Marshall and Dr. Jianli Chen, of University of Idaho. The barley breeding program will use the nursery for FHB evaluation on the elite barley lines. At least 200 elite barley lines will be planted in the nursery as 4.5 Ft. rows. Each line will be replicated twice. Common lines with known FHB resistance including CDC Copeland, Quest, and ABI Voyager will be planted in multiple replications as controls. When plants reach head emergence and flowering, inoculums will be applied to the plants by either CO₂ sprayer. The plants will be kept moist by using misters and maintaining dew-forming conditions overnight. The disease will be scored for each line using a percentage scale. The average disease index will be calculated and compared to controls.

This project will establish the FHB resistance genetic resource basis for the barley breeding program at Aberdeen, Idaho. Successful completion of the proposed objectives will lead to identification of FHB resistant lines with good agronomic and malting quality traits. The information derived from this project will help the Aberdeen barley breeding to rapidly develop FHB resistant barley cultivars. Identified FHB resistant lines will be useful for other breeding programs.