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PROJECT 1 ABSTRACT
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Fusarium Head Blight (FHB) causes extensive yield and quality losses. The deployment of high-yielding FHB resistant varieties is a critical for effective economic control. Breeding for FHB resistance is difficult due to low heritability and complex genetics. Breeding requires screening many lines to combine FHB resistance with the other traits required in an economically viable cultivar. Improving FHB resistance efficiently requires both phenotypic selection and molecular breeding. It is our objective to use traditional and molecular breeding technologies in a program that will insure a steady release of FHB resistant cultivars while building parents for future success. Our objectives are:

1. Generate new populations of inbred lines from parents chosen to facilitate recombination of genes from elite and exotic sources for yield, adaptation to Ohio, and resistance to FHB and other diseases
2. Use parents generated by molecular breeding as parents to pyramid QTL for FHB resistance
3. Use best lines in crossing program to initiate backcross and recurrent selection populations.
4. Screen inbred lines for FHB resistance in misted and inoculated FHB nurseries

Breeder's need to produce a steady stream of new cultivars each year with desired agronomics, yield potential, quality, and FHB resistance. This can be achieved by integrating parent building, phenotypic selection, and directed use of molecular breeding for FHB resistance in a good genetic base. The genetic base of the OSU program has considerable native resistance. Even OSU lines previously unselected for FHB resistance show a very high frequency of useful resistance almost exclusively from native sources. The OSU program is also successfully combining native FHB resistance with yield. These OSU lines and many others are already being used in forward and backcrosses that use marker-assisted selection for *Fhb1*.