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New Dwarfing Alleles and Their Impact on Wheat Growth and Development

The semi-dwarf genes in wheat are mutant forms of the Reduced Height (*Rht*) genes that make wheat plants shorter and higher yielding. Because of their reduced stature, these semi-dwarf wheat varieties are less prone to lodging when increased water and fertilizer is applied. The goal of this research project is to test and screen three wheat populations segregating for new *Rht* alleles and measure plant phenotypes on the same populations. The populations being screened are BC₂F₂ segregating populations. The populations were screened by isolating DNA from individual plants and doing two stage PCR to amplify the *Rht* coding sequence from each DNA sample. Then the samples were sent in for sequencing and the results were analyzed for single point mutations within the *Rht* gene. The impact of the new *Rht* alleles will be assessed by measuring the growth and yield of wheat plants that are homozygous for the presence or absence of the new *Rht* mutation. Some of the plant phenotypes that are being measured are plant height, tiller number, coleoptile length, and photosynthetic rates. This will allow us to assess the impact of the new *Rht* alleles upon wheat growth and development. The goal of this research is to overcome the negative aspects of currently utilized *Rht* dwarfing alleles by identifying *Rht* variants conferring height, protein content, and coleoptile length intermediate between full height and semi-dwarf.

Acknowledgements: Emma Jobson (MSU Graduate Student) - Plant Sciences & Plant Pathology