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EVALUATION OF SPRING WHEAT FOR RESISTANCE TO THE ORANGE WHEAT BLOSSOM MIDGE

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The orange wheat blossom midge Sitodiplosis mosellana (Gehin) has the potential to severely reduce the quantity and quality of spring wheat (*Triticum aestivum* L.) grain. All Canadian spring wheat cultivars evaluated at the time of a wheat midge outbreak in 1983/84 were susceptible to the pest (Wright and Doane, 1987).

The primary objective of this project is determine whether spring wheat genotypes can be selected for resistance to the midge on the basis of phenolic acid content of the grain. Twenty-six homozygous spring wheat breeding lines and 6 cultivars were evaluated in a four-replicate RCBD at Saskatoon and Watrous, SK, in 1995. In addition 77 Plant Introductions were evaluated in unreplicated plot for wheat midge infestation. The breeding lines were derived from crosses between Canadian germplasm and the German cultivar 'Arin'. The latter is reported to be partially resistant to *S. mosellana* (Basedow, 1977). Larval counts were conducted on the primary and secondary florets from 10 spikes per plot.

Averaged over the two sites Arin had a floret infestation level of 7%. The cultivars Laura, CDC Teal, Katepwa, and Roblin had levels of 11, 15, 18 and 26%, respectively. Thus, there was up to a 3.7-fold difference in infestation level between Arin and the Canadian cultivars. Arin averaged 1.28 larvae/infested floret compared to 1.48, 1.66, 1.71 and 2.10 for Laura, CDC Teal, Gatepwa and Roblin, respectively. The experimental lines ranged from 5 to 26% in floret infestation. Genotypic differences in level of midge infestation were highly significant ($P < 0.001$). Based on data collected at Saskatoon, grain yield and degree of midge infestation were negatively correlate ($r = -0.61^{**}$) in this germplasm. Emergence and flight activity of the insect was detected over a five week period at both test sites. None of the wheat lines appeared to avoid or escape pest infestation as a result of phenological differences. Floret infestation and grain damage were highly correlated ($r = 0.091^{**}$). Half of the damaged seed was moderately to severely shrivelled and would likely have been blown out the back of a commercial combine. Level of insect infestation was negatively correlated with ferulic acid content of the grain (-0.51^{**}). Based on 15% divergent selection pressure, wheat genotypes with the highest level of ferulic acid suffered 41% less insect infestation than genotypes with the lowest levels. Thus, based on one year's data it appears that ferulic acid content is associated with partial resistance to the orange blossom wheat midge. Of the German spring wheat cultivars examined, approximately 20% were similar to Arin with regards to insect infestation.

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