Poster 57. Stem rust resistance in Jagger winter wheat.

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Jagger has been utilized widely in hard red winter wheat varieties throughout the southern Great Plains, yet the genetic basis of its stem rust resistance remains unresolved. Marker analysis and resistance to leaf rust and stripe rust demonstrate that Jagger has the chromosome 2AS *Aegilops ventricosa* segment containing resistance genes *Sr38*, *Lr37*, and *Yr17*. However, Jagger's stem rust infection types are inconsistent with the presence of *Sr38*. Seedling tests with Jagger and the stem rust differential line with *Sr38*, Trident, are similar for all races except TPMKC and TTTTF. Jagger has a high infection type to TPMKC and the *Sr38* differential has a low infection type, whereas Jagger is low and *Sr38* is high when inoculated with TTTTF. A BC_1F_3 population was developed and screened with race TTTTF. Genotyping of bulked resistant and susceptible samples was conducted using the 9,000 SNP IlluminaiSelect Bead Chip. Linkage mapping is currently underway to identify chromosomal regions associated with resistance.

Poster 58. Identification and mapping of genes expressing and suppressing resistance to stripe rust in synthetic hexaploid wheat.

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Stripe rust, caused by *Puccinia striiformis* f. sp. *tritici*, is one of the most devastating foliar diseases of wheat resulting in 5–25% losses worldwide. Use of resistant cultivars is the best strategy to combat this disease. *Aegilops tauschii*, the D-genome donor of hexaploid wheat, is a rich source of resistance genes to different diseases. To identify potential new stripe rust resistance genes, six accessions from the WGGRC gene bank, Manhattan, KS, were evaluated for resistance to stripe rust race PSTv-46 at the seedling stage under controlled conditions. Four amphiploids were synthesized by crossing resistant *Ae. tauschii* accessions with extracted tetraploids Prelude or Thatcher. All four amphiploids, the donor *Ae. tauschii* accessions, and tetraploid Prelude and Thatcher were evaluated as seedlings for resistance to race PSTv-46. All lines, except the donor *Ae. tauschii* accessions, were susceptible to race PSTv-46. Resistance of *Ae. tauschii* was not expressed in synthetic hexaploid wheat, suggesting the presence of suppressor gene/s in the A and/or B genomes of tetraploid Prelude and Thatcher. For further genetic analysis of suppression of resistance, the amphiploid TA4161-L4, from cross between *Ae. tauschii* accession TA2435 and tetraploid Thatcher, was crossed to the wheat cultivar Lal Bahadur to produce a segregating F_2 population. Evaluation of the F_1 resulting from cross between TA4161-L4 and Lal Bahadur, 134 F_2 individuals and parents was conducted for resistance to race PSTv-46 of stripe rust at seedling stage. The F_1, TA4161-L4, and Lal Bahadur were susceptible, whereas the F_2 population segregated for resistance in 13S:3R ratio indicating presence of dominant suppressor in A and/or B genomes of tetraploid Thatcher. From evaluation of 99 $F_{2:3}$ families of this population at seedling stage with stripe rust race PSTv-46, we identified 10 families segregating for resistance gene in 3R:1S ratio with postulated genotype *Rrss*, 14 families segregating for suppressor gene in 3S:1R ratio with postulated genotype *RRSs*, 19 families segregating for the resistance gene and suppressor gene in 13S:3R ratio with postulated genotype *RrSs*, 3 homozygous resistant families with postulated genotype *RRss*, and 53 completely susceptible families with genotypes either *RRSS*, *RrSS*, *rrSS*, *rrSs*, or *rrss*. Mapping of the resistance and suppressor genes using bulked-segregant analysis is in progress.