AEGILOPS AS A SOURCE OF DIETARY FIBER AND DROUGHT STRESS TOLERANCE

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Aegilops geniculata and *Ae. biuncialis* are tetraploid species with the U and M genomes. They are known to have resistance to biotic and abiotic stresses, but also have high nutritional value (high dietary fiber (DF), Fe and Zn). The aim of our work was to determine the effects of the addition of *Ae. geniculata* and *Ae. biuncialis* chromosome on the protein and DF content and composition of Chinese Spring and Mv9kr1 wheat lines. The effect of the drought stress on these components were also determined. Drought treatment was started at Zadoks-41 developmental stage by witholding water and then the moisture content were kept at 10-15%. In addition to thousand kernel weight (TKW), Kjeldahl protein content, gluten protein composition (glutenin/ gliadin ratio (Glu/ Gli by SE-HPLC) and the contents of DF (β-glucan, total (TOT) and water-extractable (WE) pentosan) were measured by spectrophotometric assays of wholemeal samples. The structures of the β-glucan and arabinoxylan (AX) fractions were also compared by enzyme fingerprinting of the released oligosaccharides by HP-AEC. The chromosomal positions of putative orthologs of the key genes determining these components were also identified using *Ae. umbellulata* chromosome sequences. Seeds of both *Aegilops* species had higher proportions of β-glucan compared to pentosan than wheat lines, and elevated β-glucan contents were also observed in wheat chromosome addition lines 5U, 7U and 7M. The pentosan content in wheat was increased by the addition of chromosomes $5U^g$, $7U^g$ and $1U^b$ while WE pentosan was primarily increased by the addition of 5U, 5M and 7M. Chromosomes $5U^g$ and $7M^b$ also affected the structure and solubility of wheat pentosan. The application of drought stress mitigated the significant differences and/ or eliminated increases observed in the unstressed seeds for traits such as the protein content, the TOT- and WE-pentosan contents, and the ratio of the unsubstituted AX molecules. At the same time more chromosome additions affected the TKW, the Glu/ Gli ratio and the β-glucan content under drought than under control conditions. These results will contribute to the efficient transfer of wild alleles in introgression breeding programs to develop wheat varieties with improved health benefits and drought stress tolerance.

Keywords: wheat, Aegilops, dietary fiber, drought