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WSC remobilization to grain under drought in wheat

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Stem water soluble carbohydrate (WSC, mainly fructan), as a main storage carbon source before anthesis, can contribute up to 57% of wheat grain yield under terminal drought stress. However, the remobilization of stem WSC varies depending on the growth stages, conditions and genotypes. Therefore, it is worthwhile to further investigate the attributes on high remobilization efficiency of stem WSC. In recent study, two wheat varieties: Westonia, Kauz and their derived 20 double haploid (DH) lines with large genetic variations were used in field drought experiments. The results clearly showed that the genetic variation is involved in stem WSC remobilization to grain under drought; a key enzyme (1-FEH w3) degrades 2-1 linkage fructan and contributes the stem WSC remobilization; a marker generated within auxin response element (AuxRE) in the promoter region of 1- FEH w3 correlates with high stem fructan remobilization capacity and the 1-FEH w3 Westonia allele is associated with high grain weight under drought. In the stem segment analysis, fructan remobilization occurred earlier in lower parts of the stem and sheath under drought, which was associated with an earlier increase of grain weight and thousand grain weight in earlier mature lines. Root WSC and fructan were one third of the levels in stems. The significant correlation between root fructan levels and grain assimilation indicate that under terminal drought, root WSC represents a redistributed carbon source for grain filling rather than deep rooting. Our results further confirmed that β-(2-6) linkage predominate in wheat, which leads the future study.

Biography

Jingjuan Zhang has completed her PhD from Murdoch University in 2008 and followed by Postdoctoral studies. She has 25 years of work experience in wheat and has published 16 papers in reputed journals and the recent seven first authored papers and one co-authored paper are relevant to water soluble carbohydrate remobilization in wheat.

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