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P 133 - Topic: Genetics and Genomics of Resource Efficiency; Quality and Composition

End-use quality of soft kernel durum wheat

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Key message: Soft kernel durum wheat possessing the *Hardness* locus exhibits milling and baking characteristics consistent with soft hexaploid wheat. Various durum parents contribute significant variation to soft durum wheat end-use quality.

Kernel texture is a major determinant of end-use quality of wheat. Durum wheat is known for its very hard texture, which influences how it is milled and for what products it is well suited. We developed soft kernel durum wheat lines via *Ph1b*-mediated homoeologous recombination with Dr. Leonard Joppa. The *Hardness* locus from Chinese Spring was successfully transferred to cv. Svevo durum wheat; Svevo was back-crossed 3 times to produce 'Soft Svevo' (Morris et al. 2011). Soft Svevo had SKCS kernel hardness, break flour yield, flour starch damage, and flour particle size similar to soft hexaploid wheat (Murray et al. 2016). Compared to Svevo, Soft Svevo had much reduced Solvent Retention Capacity (SRC) -water, -carbonate, and -sucrose; whereas SRC-lactic acid was similar to Svevo. Similarly, Mixograph, Farinograph and Alveograph results indicated much reduced water absorption, but similar gluten strength. Cookie diameter of Soft Svevo was markedly larger and similar to soft wheat (Murray et al. 2017). The energy required to produce flour was dramatically reduced: 624±200 kJ/kg flour for Svevo vs. 146±20 kJ/kg flour for Soft Svevo. When Soft Svevo was crossed to 10 CIMMYT durum parents, half-sib families and full-sib lines within families showed significant differences in SKCS hardness, break flour and total flour yields, starch damage, SRC-water, -carbonate, -sucrose, and -lactic acid, and flour SDS sedimentation volume. Cookie diameters ranged from 8.68 to 9.57 cm. Mean bread loaf volumes for families ranged from 680 to 838 cm³. Results illustrate the significant effect of the *Puroindoline* genes and the *Hardness* locus on kernel texture and end-use quality, and demonstrate that soft kernel durum wheat has properties similar to soft hexaploid wheat. Further, the hard durum parent has a significant effect on end-use quality traits by contributing superior alleles for soft wheat milling, flour properties, dough and bread quality.

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