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Flowering earliness in wheat inbred breeding lines derived from *T. aestivum* 'Chinese Spring' x *Dasypyrum villosum* hybridization is not related to allelic variation at the vernalization loci *VRN-A1*, *VRN-B1*, and *VRN-D1*

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ABSTRACT: The wheat inbred breeding lines (IBLs) "CSxV58", "CSxV59" and "CSxV60" derived from *T. aestivum* "Chinese Spring" ("CS") x *Dasypyrum villosum* (*"Dv"*) intergeneric hybridization showed several phenotypic differences compared to "CS", including earlier date of flowering. The IBLs have the same "CS" euploid chromosome number and structure, and GISH did not reveal any apparent addition of *"Dv"* chromatin. However, the earlier generation line that gave rise to "CSxV58" had an acentric *"Dv"* chromosome fragment which was lost in the following generations, and the IBLs when compared to "CS" showed differences for about 16% of the 166 AFLP fragments detected in replicated runs of gel electrophoresis. This indicated that substantial criptic chromosome mutations or recombinations or gene mutations have occurred during the earlier generations following the hybridization event and that these rearrangements were transmitted to the plants from which the IBLs derived. One of these mutations might have affected a flowering-promoting gene at a locus different from *VRN-1*, causing (under nonvernalizing condition and 13-14-hour daylength) the IBLs, "CSxV59" x "Salgemma", and "CSxV59" x "Isengrain" F_1 plants to start anthesis in less than 50 days from sowing compared to "CS" and to the two winter bread wheat cultivars "Salgemma" and "Isengrain", which flowered about 150 days later.

Keywords: *Triticum aestivum*, *Dasypyrum villosum*, vernalization, *VRN-1* genes, AFLP.

Introduction

'Chinese Spring' ("CS") as other *T. aestivum* cultivars carries three homoeologous copies of the *VRN-1* gene, one in each of the three genomes, which are designated *VRN-A1*, *VRN-B1*, and *VRN-D1*. *VRN-A1* is the wheat ortholog of the *Arabidopsis* meristem identity gene *APETALA1* (*AP1*). Mutations in the *VRN-1* promoter region (Yan *et al.*, 2003) or large deletions within the first intron (Fu *et al.*, 2005) produced dominant *Vrn-A1*, *Vrn-B1* and *Vrn-D1* alleles which were sufficient to confer a spring growth habit in diploid and polyploid wheat.