

Study of the interphase period “shoots–earring” of 8x and 6x triticale with different dominant *Vrn* genes

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Duration of the interphase period “shoots–earring” of two groups of octaploid (8x) and a group of hexaploid (6x) triticale with different dominant *Vrn* genes affecting the length of the plant period of vegetation was studied in 2014 and 2016–2018. Four 8x triticale forms were produced in the Siberian Research Institute of Plant Production and Breeding – Branch of the Institute of Cytology and Genetics, SB RAS by crossing between a winter diploid rye variety Korotkostebel'naya 69 and nearly isogenic lines of soft wheat Triple Dirk D, Triple Dirk B, Triple Dirk E and Triple Dirk F (obtained from N.P. Goncharov), bearing respectively dominant genes *VrnA1*, *VrnB1*, *VrnD1* and *VrnD4*, and by subsequent doubling of the wheat-rye hybrids' chromosome number. By selection of the most early maturing plants in the progeny of hybrids made by crossing on 4 combinations: $8xVrnA1 \times 8xVrnD1$, $8xVrnB1 \times 8xVrnD1$, $8xVrnA1 \times 8xVrnD4$, $8xVrnD1 \times 8xVrnD4$, new 8x triticale genotypes, bearing pairs of dominant *Vrn* genes were obtained. Spring hexaploid triticale forms were developed by selection of the most early maturing plants in the progeny of the hybrids F_3 – F_4 between the 8x forms and a winter 6x triticale variety Sears 57, bearing recessive *vrn* genes. It was found that triticale plants of both ploidy levels had a short interphase period “shoots–earring” if they contain one of the dominant genes *VrnA1* or *VrnD1*, in contrast to those triticale plants that contained one of the genes *VrnB1* or *VrnD4*. In 2018 the interphase period “seedling–heading” lasted 49.5 ± 2.6 days (genotype $8xVrnD1$), 51.0 ± 1.8 days (genotype $8xVrnA1$), 71.2 ± 4.3 days (genotype $8xVrnB1$) and 74.3 ± 1.7 days (genotype $8xVrnD4$) in the group of 8x triticale. Hexaploid triticale plants have the same dominant *Vrn* genes as their initial 8x forms. The *VrnA1* and *VrnD1* genes of hexaploid triticale plants conditioned short “shoots–earring” interphase period in comparison with the *VrnB1* and *VrnD4* ones. In 2018 the 8x triticale forms, selected from the combinations of crosses $8xVrnA1 \times 8xVrnD1$ and $8xVrnA1 \times 8xVrnD4$ had the shortest interphase period “shoots–earring” – 42.8 ± 4.0 days and 43.0 ± 1.8 respectively. Their plants have two dominant genes. The gene *VrnA1* is likely to have the strongest effect. On the basis of this research work, a collection of spring octaploid and hexaploid triticale forms bearing identified dominant *Vrn* genes responsible for both the spring type of plant development and the duration of the vegetative period is being made. Some of spring hexaploid triticale forms are used in breeding programs.

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