and quality, some were not significantly different, and decreased in others. In NIL 573, from a cross between the cultivars L503 with Taro1, grain yield significantly decreased compared with the parental recipient cultivar, but in NIL 345, where Belyanka was crosse with Taro1, the grain yields were nearly similar (Table 3, p. 61). These lines were different in gluten content and strength of gluten; NIL 573 did not differ from L503, but those for NIL 345 were lower than those of Belyanka. In NIL 573, dough extensibility and strength of flour were were significantly higher than that of cultivar L503, whereas in NIL 345, they were slightly different from those of Belyanlka. Similar data were obtained in other lines obtained from crossing with durum wheat cultivars. Dough extensibility and strength of flour were significantly higher in NIL 202 than in Favorit, lower in NIL 216 than Dobrynya, and similar in NIL 293 and Dobrynya. In NIL 214, dough extensibility was equal to that of L505, but flour strength was lower (Table 3, p. 61). These studies show that grain yield and quality in introgression lines of spring wheat *using T. turgidum* subsp. *durum* is largely determined by the cross combination. We plan to continue studying the introgression lines carrying genetic material from *T. turgidum* subsp. *durum*.

The influence of translocations T7DS·7DL–7Ae#1L + T1BL·1R#1S and a 6D (6Ag^{i}) substitution on callusogenesis and regeneration in wheat plants.

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Modern wheat biotechnology involves the use of somatic cell culture and tissues *in vitro*. Therefore, we studied the effect of T7DS·7DL–7Ae#1L + T1BL·1R#1S combination and A 6D (6Ag^{i}) chromosome substitution on callus formation and plant regeneration of spring bread wheat. Substitution line 6D (6Ag^{i}) has the gene combinations *Lr19*/*Sr25* + *Pm8*/*Sr31*/*Lr26*/*Yr9* and *Lr6Ag^{i}*. Two experiments using a set of two pairs of near-isogenic lines (NILs) L-503R (*Lr*19 + *Lr*26 translocations) and L-503S (*Lr19* translocation), and L-400R (6D (6Ag^{i}) substitution chromosome) and L-400S (normal 6D). Donor plants were grown in the field and greenhouse. In the first experiment, the ratio of the mass of callus after 20 days of culture (W20) to the weight of the explants (Wi) in the NILs L-503R and L-503S were significantly different; the NIL L-400R significantly exceeded those of NIL L-400S. The second experiment revealed significant differences in the W20/Wi for both NIL pairs. No differences in the ratio of the number of regenerates to the weight of callus after 20 days of culture in both NIL pairs were not observed in the all experiments. Thus, the specific effects of T7DS·7DL–7Ae#1L + T1BL·1R#1S translocation combination and the 6D (6Ag^{i}) chromosome substitution on processes callusogenesis during culturing of somatic cells *in vitro* were found.

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Aluminum tolerance in spring triticale.

Species, and genotypes within species, are known to differ widely in their tolerance to aluminum. Aluminum (Al) toxicity primarily affects cell division in the root apex. the root meristem and zone of elongation are highly sensitive to Al and accumulate it very easily, resulting in root damage. This study evaluated the levels of aluminum tolerance in spring triticale varieties, using root regrowth to characterize Al tolerance.

Materials and methods. Sixteen cultivars of spring triticale were tested for Al tolerance. We used a method based on root activity exposure to solutions with aluminum (Aniol and Gustafson, 1984; Ma et al., 2000; Matos et al., 2005; Fontecha et al., 2007), with modifications.

Seeds were germinated at 20°C in a 10^{-4}M $CaSO_4$ solution. Seedlings with a root length of 1.0–1.5 mm were placed in plastic cups in 250 mL of a 10^{-4}M $CaSO_4$ solution and grown 48 h (Fig. 1), which was replaced daily. Five seedlings were placed in each cup, with three replications. The $CaSO_4$olution was replaced with one containing either 10, 20, or 40 mg $AlCl_3 \cdot 6H_2O$/L for 24 h. Roots were stained in a 0.15% Eriochrome (black) solution. Plants were grown for 48 h and root regrowth was measured. Plants that maintained the ability to regrow roots were observed (Fig. 2). Groups of Al tolerance were separated according Butnaru et al. (1998).

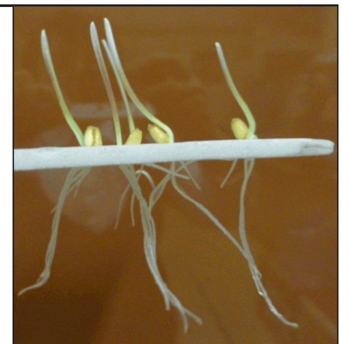

Fig. 1. Seedlings of spring triticale on a plastic float.

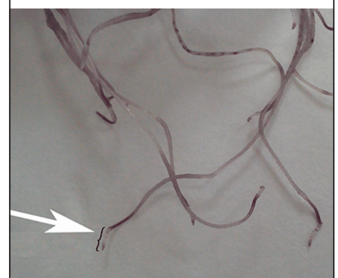

Fig. 2. Root regrowth after aluminum treatment.

Results and discussion. The spring triticale varieties were classified as highly tolerant, tolerant, medium tolerant, and intolerant according to their root regrowth after an Al stress.

Highly tolerant (root regrowth on solution without Al after 24 h in a solution with Al concentrations of 10, 20, or 40 mg/L): Ulyana, Yarilo, Meksika 38, Meksica 51, Legalo, Presto/Tesmo, Dublet, Lana, and 131/7.

Tolerant (root regrowth in a solution without Al after 24 h in a solution with Al concentration 10 or 20 mg/L): Gabo, Wanad, and Hlebodar Harkovskij.

Medium tolerant (root regrowth in solution without Al after 24 h in a solution with an Al concentration 10 mg/L): Grebeshok and Activo.

Intolerant (no root regrowth): Sandro, Abaco, and Grego.

We supposed that cereals differ in response to Al in decreasing order: rye, triticale, wheat. In some of our experiments with acid soils, triticale has Al tolerance, which is not confirmed in experiments using only one characteristic. A comparison in the decrease in yield of spring triticale and spring wheat, which were grown in pots with a soil application of 6 mg $AlCl_3$/kg of soil, was made (Fig. 3). We propose that the mechanisms of Al tolerance differ for triticale and wheat. The level of decrease was lower, even for the highly tolerant spring triticales Yarilo and Legalo. Tolerance was higher in spring wheat.

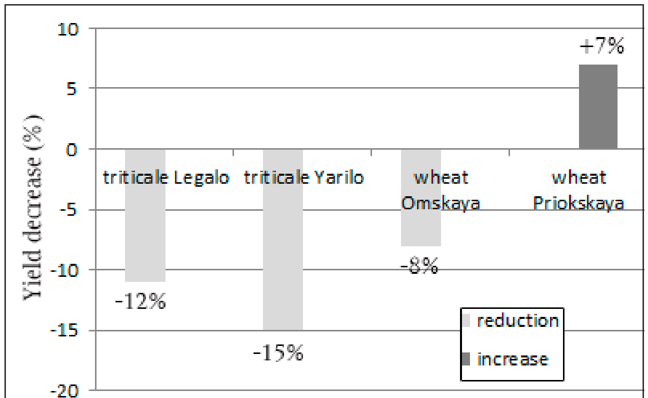

Fig. 3. A comparison of the decrease in yield of spring triticale and spring wheat grown in soils with Al^{3+}.

Conclusion. These results indicate that a single test for Al tolerance is not sufficient for grouping spring triticale varieties. Aluminum tolerance has different mechanisms, which have complex determinations on growth and yield of triticale and wheat in stress conditions. To estimate Al tolerance in triticale and wheat, a complex investigation is necessary, which would include testing at different stages of plant development and growth until harvest.

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