this region as the most infective source of different virulent phenotypes of stem rust pathogen for cereal grasses. In Central Russia, race TKNTF dominated on coach grass (*Elytrigia*), timothy grass (*Phleum*), and fescue (*Festuca*) in addition to barberry. The virulent phenotype TTKS (Ug99) was not fixed in 2007 and was not found before (Lekomtseva et al. 2004, 2007). Some of the *Sr* genes of wheat, *Sr9b*, *Sr13*, *Sr24*, and *Sr31* were resistant to all stem rust isolates in 2007 (Table 2). Gene *Sr11* was susceptible during 2001–05 but is now resistant. All these genes are recommended for plant-breeding programs to use agains the wheat stem rust pathogen in the Russian Federation.

Table 2. Virulence of isolates of *Puccinia graminis* f.sp. *tritici* to Sr lines of wheat 2007 in the Russian Federation (%).

Gene	%	Gene	%	Gene	%	Gene	%
Sr5	100.0	*Sr9b*	9.3	*Sr11*	21.0	*Sr31*	0.0
Sr6	100.0	*Sr9c*	100.0	*Sr13*	00	*Sr36*	100.0
Sr7b	100.0	*Sr9d*	100.0	*Sr21*	97.0	*Sr38*	100.0
Sr8a	100.0	*Sr9e*	100.0	*Sr24*	0.0	*SrTmp*	100.0
Sr9a	100.0	*Sr10*	100.0	*Sr30*	100.0	*SrWld*	100.0

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Encapsulating winter wheat seed.

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Encapsulating seed creates a macronutrient environment for starting seed. The surface of seed adsorbs NPK and this is more effective than adding to in soil nearby. However, the negative effect of this method is an increase in the osmotic concentration of solution and the high sensitivity of seedlings.

Materials and methods. Seedlings of winter wheat were grown for 10 days at 21°C in plastic cups. Before germination, the seeds were encapsulated with four different solutions: 1 – H_2O, 2 – a 1% soluble, complex fertilizer (NPK), 3 – a 2.5% soluble, complex fertilizer (NPK), and 4 – a 5% soluble, complex fertilizer (NPK).

Results and discussion. The swelling dynamics of seed and the change in the seed humidity in first four days of growth depended upon the concentration of the treatment solution. High concentrations of solution diminished the speed of germination substantially (Fig. 1). The first negative effect observed on the encapsulated seeds was a decline in germination (Fig. 2, p. 180). Increasing the concentration of the treatment solution caused a decline in seed germination (black) and multiplied the number of seed that perished after primary germination (white) (Fig. 2, p. 180).

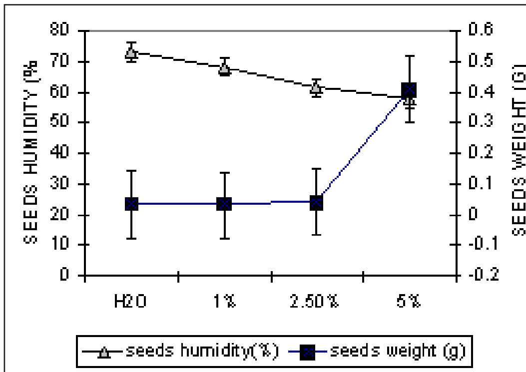

Fig. 1. Change in humidity and weight of seeds depending on concentration of an encapsulation solution (Control is H_2O only).

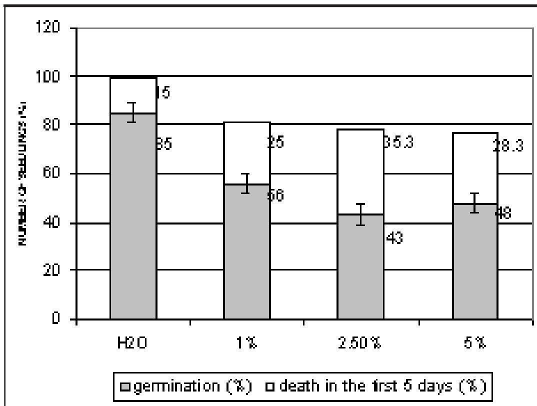

Fig. 2. Germination (%) and the number of dead seedlings after the first five days for different concentrations of encapsulation solutions (Control is H_2O only).

For the first seven days, a plant is nourished from the seed. For this reason, after four days H_2O-treated seedlings overtake encapsulated treated seeds by more then 20%. But at nine days after germination, encapsulated seeds begin to overtake the control plants in proportion to the treatment (Fig. 3).

Using seed encapsulation under soil stress conditions (at a high concentration of Al ions in the soil solution) reduces the negative effect of the high concentration of NPK in the treated seeds. At an increase in the soil solution of the aluminum ions in an encapsulation solution renders a protective effect, causing formation of Al complexes and an increase in seedling growth.

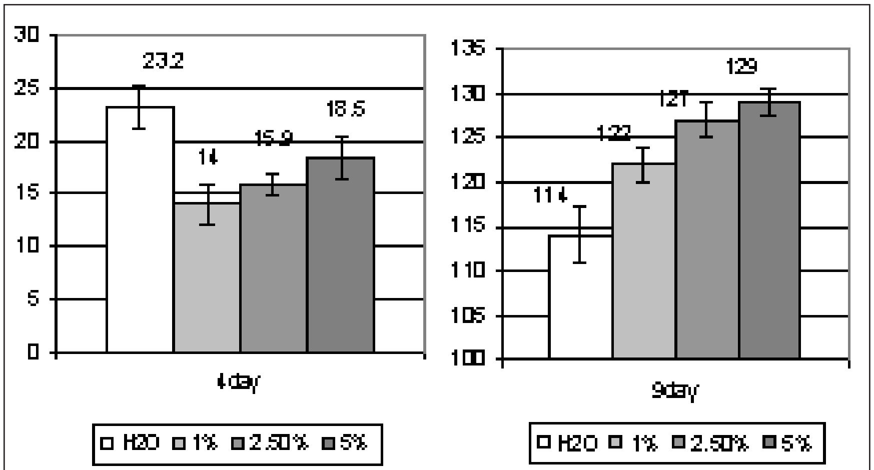

Fig. 3. Length of seedlings (mm) after four and nine days growth for different concentrations of encapsulation solutions (Control is H_2O only).

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Estimating different kinds and lines of spring bread wheat for total resistance to fungus diseases.

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Since 2005, we estimated the resistance of material for loose smut, powdery mildew, and leaf and stem rust in the city of Saratov, Russian Federation. The total resistance to all investigated pathotypes of loose smut have shown that the cultivars Zhigulevskaya and Saratovskaya 70 and lines L658-01 and L2040 are most resistant. The cultivars Lutescens 62, Dobrinja, L503, and L504 were susceptible to all the investigated patotypes. Other cultivars showed race-specific resistance.

A pedigree analysis of the cultivars with sources of resistance to any pathotype of loose smut included *T. turgidum* subsps. *durum, dicoccum,* and *turgidum, T. timopheevi* subsp. *timopheevii,* and *Elytrigia intermedia* and also the cultivars Krimka (a local winter wheat cultivar from Ukraine), Ostka Halisijskaza (a spring bread wheat from Poland),