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“Development on the margin”

Osmopriming Improved Germination Parameters of Water Deficit Stress derived Soybean Seeds under Low Temperature Condition

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Abstract

In order to evaluate the effect of osmopriming on the germination characteristics of soybean (*Glycine max* L.) seeds formed on the mother plant affected by water deficit stress under low temperature conditions were investigated using a phytotron at Tarbiat Modares University in 2009. Treatments were arranged in a factorial experiment on the basis of randomised complete blocks with four replications. Factors consisted of: soybean cultivar (including DPX, Telar and 032), water deficit stress on mother plants including irrigation after 50, 100 and 150 millimeters evaporation from evaporation pan class A, representing control, mild stress and severe stress, respectively, and osmotic pre-treatment at 5 levels including non-priming and osmopriming with solutions of PEG6000 with osmotic potentials of -5, -10, -15 and -20 bar. After planting the seeds were put in a phytotron for 7 days at 10°C and for 4 days under condition of 16/8 h (day/night) with 30/20°C. The results showed that osmoprimed seeds with PEG6000 have an increased final germination percentage, a normal seedlings percentage, coefficient of velocity of germination, mean daily germination, length and dry weight root and shoot compared with control (non-priming) in terms of low temperature. Osmotic pre-treatment has also reduced abnormal seedlings percentage and mean time to germination. So that the pre treated seeds with -20 bar solution had the highest germination percentage (92.8%). Most normal seedling (87.6%) were observed in pre treated Telar seeds with -10 and -20 bar solutions and the lowest abnormal seedling (8.23%) were obtained in osmoprimed seed of 032 cultivar, with -20 bar solution. The longest root (14 cm) and shoot (9.94 cm) were observed in seeds pretreated with -10 bar solution and the shortest in non primed seeds. The pre-treated Telar seeds with -10 bar solution had the highest dry weight root (14.6 mg) and shoot (20.91 mg) compared with control. According to our findings osmopriming strengthens soybean seed and will in this way allow an early culture even under low temperatures.

Keywords: Drought stress, low temperature, osmotic pre-treatment, soybean (*Glycine max*)