

The Osmopriming Improved Germination Parameters of Water Deficit Stress Driven Soybean Seeds in Low Temperature Condition

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Abstract

In order to evaluate the effect of osmopriming on the germination characteristics of soybean (*Glycin max* L.) seeds formed on the mother plant affected by water deficit stress in low temperature conditions a phytotron investigation was conducted at Tarbiat Modares University on 2009. Treatments were arranged in a factorial experiment on the basis of randomized complete blocks with four replications. Factors consisted of: **soybean cultivars** (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 as control, mild stress and severe stress respectively and **osmotic pre-treatment** in 5 levels includes non-priming, osmopriming with solutions of PEG₆₀₀₀ with osmotic potentials -5, -10, -15 and -20 bar. After planting (as BP) the seeds were carried out in a phytotron in conditions of 7 days at 10 ° C and 4 days in condition of 16/8 h (day/night) with 30/20 °C temperature. The results showed osmoprimed seeds with PEG₆₀₀₀ have increased final germination percentage, 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 most dry weight root (14.6 mg) and shoot (20.91 mg) compared with control (non-primed). According to our findings in early cultures that there is the possibility occurrence of low temperature, osmoprimed seeds would be strengthened and achieve acceptable emergence guarantee.

Keywords: Osmotic pre-treatment, drought stress, low temperature, soybean (*Glycin max* L.)