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“Development on the margin”

Effect of GA3 on Seed Germination of Soybean Cultivated under Water Stress and at Different Planting Dates

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Abstract

Priming is one of the seed enhancement methods that might result to increase seed performance (germination & emergence) under harsh conditions, such as salinity, high temperature and drought. This experiment was carried out to study the effect of GA3 on seed germination characteristics of soybean [*Glycine max* (L.) Merr.] produced under different water deficit levels at different planting dates. A factorial experiment was conducted within a completely randomised design at the seed & plant certification and registration research institute, Karaj, Iran. M7 cv. seeds were produced under three levels of water deficit: 50 mm (no deficit), 100 mm (middle deficit) and 150 mm (severe deficit) evaporation from pan class A, at two planting dates: 22 May and 22 June. GA3 was applied at 6 different concentrations (0.1, 0.2, 0.3, 0.4 mM GA3, distilled water, no distilled water and no GA3). Our results showed that by increasing water deficit on mother plants seed quality characteristics were significantly reduced in planting date of 22 May. Those results were supported by Accelerated Ageing Test as well as standard germination test recommended by ISTA. Where, in planting date of 22 June, by severe deficit the seed quality was not affected significantly. The results of experiment showed that using 0.3 mM GA3 reduced deteriorated seeds (15%) but increased seedling length (3.36 cm), primary root length (1.57 cm), primary root dry weight (11.39mg), seedling fresh weight (291.89mg), primary root fresh weight (167.44mg) as well as primary shoot fresh weight (118.23mg). Where, concentration 0.2 mM GA3 improved the important seed quality characteristics like normal seedling (40%) primary shoot length (3.04 cm) but decreased abnormal seedling (27%).

Keywords: GA3, germination, *Glycine max*, planting dates, water deficit