

The effect of different animal manure and super absorbent polymer rates on the yield and quality of corn in drought condition

Abstract

In order to investigate the effects of drought stress and different combinations of animal manure and super absorbent polymer on quantitative and qualitative characteristics of corn, a split plots design was conducted on the randomized complete block design with 3 replication performed in Agricultural Research Center of Fars in 2007. Irrigation treatments were main factor in three levels: 70, 105 and 140 mm evaporation from pan class A, and different combinations of animal manure and super absorbent polymer application as sub plot in six levels as S_1 : control, S_2 : 100% animal manure (40 t/ha), S_3 : 100% super absorbent polymer (200 kg/ha), S_4 : 50% animal manure + 50% super absorbent polymer, S_5 : 35% animal manure + 65% super absorbent polymer, S_6 : 65% animal manure + 35% super absorbent polymer were used. The results showed that, Relative Water Content (RWC) reduced with drought stress. Cell Membrane Stability (CMS) increased with drought stress and decreased by using animal manure and super absorbent polymer. The leaf chlorophyll (SPAD) increased in response to drought stress and different combinations of animal manure and super absorbent polymer. Plant height, length of flag leaf, width of flag leaf, kernel number per ear row, kernel number per ear, 1000 grain weight, grain yield, biological yield and seed protein percentage decreased by drought stress occurrence and increased with animal manure and super absorbent polymer application. Increasing of drought stress decreased the yield. The highest yield (12.43 t/ha) was obtained in control Irrigation. Yield and yield components were significantly increased by using of both animal manure and super absorbent polymer in compare with other treatments. The results showed that, the optimum combinations of animal manure and super absorbent polymer was the S_6 treatment, and caused 15.97% grain yield and 8.95% biological yield increase in compare with control.

Key words: Corn, Animal manure, Super absorbent polymer, Yield, Grain quality, Drought stress.



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