

Effect of organic fertilizer, brassinolide and irrigation water salinity on growth and yield of pepper

PHD Thesis

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Two experiments were conducted at the vegetable field of Horticulture department, College of Agriculture, Baghdad University " Abu Ghraib" for two successive seasons 2013 and 2014 in order to study the effect of poultry manure and 24-epibrassinilide of mitigating the impact of salt stress and its reflect on growth and yield of sweet pepper " California Wonder " . Nested design with three replicates was adapted.

The first experiment included 12 treatments which is watering plants with three levels of irrigation wells water (1.9 , 2.0) ds.m^{-1} (for two seasons respectively) ,3 and 5 ds.m^{-1} of NaCl (S1, S2 and S3) , with four fertilization treatments included control (F0), recommended chemical fertilizers(F1) , poultry manure at 3% (F2) and 5% (F3) of soil volume. The second experiment included 12 treatments which plants irrigated with three water salinity levels (1.9 , 2.0) ds.m^{-1} (for two seasons respectively) ,3 and 5 ds.m^{-1} of NaCl (S1, S2 and S3) , with four treatments of brassinolide included control (BLO) and foliar application of brassinolide at (0.1, 0.3, and 0.6) mg.L^{-1} for BL1 , BL2, and BL3 respectively .Least significant difference (LSD) at 5% probability was used to compare the means .

Results of first experiment as follows:

1- Water salinity level (S1) was superior by giving higher content of P, K, Ca , chlorophyll and K/Na ratio in leaves, while decrease proline content, peroxidase (POD) activity, Na and Cl ratio in leaves for two seasons respectively. Poultry manure treatment at 5% of soil size F3 was superior by giving higher chlorophyll content , POD activity, N, P, K, Ca and lowest proline content in leaves . Interaction treatments S1F1 and S1F3 gave higher content of total chlorophyll. While S1F1 treatment gave higher content of P, k and Ca in leaves for two seasons respectively.

2- Salinity level S3 caused inhibition of Vegetative growth characteristics for two seasons (plant height, branches number, main stem diameter , leaf area, and dry weight of vegetative growth) . F3 gave the highest values of these characteristics for both seasons respectively . S1F3 treatment caused increasing in plant height , branches number, stem diameter and vegetative dry weight, while leaf area was increased with S1F1 treatment for two seasons respectively.

3- Salinity treatments caused decreasing in Fruits set percentage and yield parameters of plants (fruit number, fruit weight and plant yield). F3 treatment was superior by giving highest values of these parameters. S1F3 treatment was superior by giving highest fruits number (24.38 , 23.85) fruit.plant^{-1} and plant yield (1.402, 1.415)

kg.plant⁻¹, while highest fruits weight was in S1F1 treatments (57.50, 59.34) gm. fruit⁻¹ for two seasons respectively .

4- Salinity treatments caused increasing of TSS and vitamin C in fruits . F3 treatment gave highest TSS .F3 treatment caused increasing TSS and vitamin C in fruit for both seasons respectively . The interaction treatment between chemical fertilizers and high level of water salinity S3F1 treatment caused increasing of TSS (8.27, 7.97)% and vitamin C (83.22, 82.76) mg.100g⁻¹ for two seasons respectively .

Results of the second experiment was as follows:

1- Water salinity level S1 caused higher content of P, K, Ca , chlorophyll and K/Na ratio in leaves, while decrease proline content, peroxidase (POD) activity in leaves for two seasons respectively. BL3 treatments was superior by giving higher chlorophyll content , proline content, POD activity and N, P, K and Ca in leaves . Interaction treatments S1BL3 gave higher content of total chlorophyll and higher content of P, k and Ca in leaves for two seasons respectively.

2- Irrigation water Salinity caused inhibition of Vegetative growth characteristics for two seasons (plant height, branches number, main stem diameter , leaf area, and dry weight of vegetative growth) , the effect was increased with increasing levels of salinity. BL3 treatment 0.6 mg.L⁻¹ was superior by giving the highest values of these parameters for both seasons respectively . S1BL3 treatment caused increasing in plant height , branches number, stem diameter and vegetative dry weight and leaf area for two seasons respectively.

3- Salinity treatments caused decreasing in Fruits set percentage and yield parameters of plants (fruit number, fruit weight and plant yield) for two season respectively. BL2 treatment was superior by increasing of fruits set percentage, while BL3 was superior by increasing highest fruits number (26.07, 25.69) fruit.plant⁻¹, fruits weight (62.60, 64.64) gm. fruit⁻¹ and plant yield (1.631, 1.660) kg.plant⁻¹ for two seasons respectively .

4- Salinity treatments caused increasing of TSS and vitamin C in fruits . BL3 treatment was superior by giving highest TSS .BL3 treatment caused increasing TSS and vitamin C in fruit for both seasons respectively . The interaction treatment S3BL3 treatment caused increasing of TSS (8.43, 7.90)% and vitamin C (84.06, 84.19) mg.100g⁻¹ for two seasons respectively .