

**IMPROVEMENT OF PRODUCTION AND
QUALITY OF GARLIC UNDER WATER
STRESS CONDITIONS**

By

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ABSTRACT

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The field experiment was carried out during the two growing seasons of 2013/2014 and 2014/2015, at the farm of Faculty of Agriculture, Ain Shams University, Shoubra El-Kheima, Egypt, to investigate the effect of irrigation at different percentage of available soil water depletion, soil conditioner, foliar application of glycine betaine and potassium silicate on vegetative growth, bulbs yield and its components as well as chemical composition of garlic (*Allium sativum* L.), cv. Sids-40. The experimental treatments were arranged in a split split plot design with three replicates. The applied irrigation levels (55-60, 70-75 and 85-90%) were assigned in the main plots, soil conditioner at the rates of 2 m³/Fed and control were distributed in the sub-plots and foliar application of glycine betaine was used at 2 mM/L, potassium silicate was used at 0.5 g /L and control (sprayed with distilled water) were devoted in the sub-sub plots. Irrigation treatments were started after six weeks from planting, foliar application of glycine betaine and potassium silicate started after 50 days and repeated for 6 times at 15 days intervals Results indicated that the irrigation after depletion of 55-60% available soil water with applying soil conditioner and foliar application of glycine betaine or potassium silicate increased the bulb fresh weight, leaf fresh weight, plant length, leaf area and leaf chlorophyll reading of garlic as well as the yield of bulbs, cloves fresh weight/bulb, cloves number/bulb, bulb diameter, Neck diameter, bulbing ratio, average clove weight, nitrogen content, protein and total carbohydrates content. While, prolin content, catalase activity, total soluble solids, ascorbic acid, phenols and total sugars were significantly increased as a result of irrigation after depletion of 85-90 % available soil water without applying soil conditioner. therefore, it was

concluded that vegetative growth, yield and chemical analyses of garlic responded positively to increased available soil water with additionally soil conditioner and foliar application of 2 mM/L glycine betaine or 0.5 g/L potassium silicate.

Key words: Garlic, Water stress, Soil conditioner, Glycine betaine, Potassium silicate, Yield.

CONTENTS

	Page
LIST OF TABLES	iii
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	3
2.1. Effect of water stress.....	3
2.2. Effect of soil conditioner.....	19
2.3. Effect of glycine betaine	25
2.4. Effect of potassium silicate	31
3. MATERIALS AND METHODS	41
4. RESULTS AND DISCUSSION	48
4.1. Vegetative growth characters	48
4.1.1. Plant length after 120 days from planting.....	48
4.1.2. Plant length after 150 days from planting.....	51
4.1.3. Bulb fresh weight after 120 days from planting.	53
4.1.4. Bulb fresh weight after 150 days from planting.....	55
4.1.5. Bulb dry weight after 150 days from planting.....	57
4.1.6. Leaf fresh weight after 120 days from planting.....	60
4.1.7. Leaf fresh weight after 150 days from planting.....	62
4.1.8. Leaf dry weight after 150 days from planting.....	64
4.1.9. Leaves number per plant after 120 days from planting.....	67
4.1.10. Leaves number per plant after 150 days from planting....	69
4.1.11. leaf area after 120 days from planting.....	71
4.1.12. leaf area after 150 days from planting.....	73
4.1.13. Bulb diameter after 120 days from planting.....	75
4.1.14. Bulb diameter after 150 days from planting.....	77
4.1.15. chlorophyll reading after 120 days from planting.....	80
4.1.16. chlorophyll reading after 150 days from planting.....	82
4.2. Yield and its components.....	84
4.2.1. Total cured yield.....	84

4.2.2. Bulb fresh weight.....	87
4.2.3. Bulb diameter.....	88
4.2.4. Neck diameter.....	91
4.2.5. Bulbing ratio.....	93
4.2.6. Cloves fresh weight/bulb.....	95
4.2.7. Cloves dry weight/bulb.....	98
4.2.8. Cloves number/bulb.....	100
4.2.9. Average clove weight.....	103
4.2.10. Cloves dry matter percentage/bulb.....	104
4.2.11. Outer cloves number/bulb.....	106
4.3. Chemical composition	109
4.3.1. Total free amino acids	109
4.3.2. Total soluble solids.....	111
4.3.3. Free Proline content	114
4.3.4. Total sugars	116
4.3.5. Ascorbic acid	119
4.3.6. Total soluble phenols	121
4.3.7. Catalase activity.....	124
4.3.8. Total carbohydrates	126
4.3.9. Total nitrogen	129
4.3.10. Phosphorus	131
4.3.11. Protein	134
5. SUMMARY AND CONCLUSION.....	137
6. REFERENCES.....	144
ARABIC SUMMARY	1

LIST OF TABLES

Table	Page
a .	Field capacity, wilting point and available soil water of the experimental soil in the two seasons of 2013 and 2014..... 42
1.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on plant length (cm) of garlic after 120 days from planting..... 49
2.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on plant length (cm) of garlic after 150 days from planting..... 52
3.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on bulb fresh weight (g) of garlic after 120 days from planting..... 54
4.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on bulb fresh weight (g) of garlic after 150 days from planting..... 56
5.	Effect of Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on bulb dry weight (g) of garlic after 150 days from planting..... 58
6	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil

	conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on leaf fresh weight (g) of garlic after 120 days from planting.....	61
7	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on leaf fresh weight (g) of garlic after 150 days from planting.....	63
8	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on leaf dry weight (g) of garlic after 150 days from planting.....	65
9	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on plant leaf number/plant of garlic after 120 days from planting.	68
10.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on plant leaf number/plant of garlic after 150 days from planting.....	70
11.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on leaf area (cm^2) of garlic after 120 days from planting.....	72
12.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on leaf area (cm^2) of	

	garlic after 150 days from planting.....	74
13.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on Bulb diameter (cm) of garlic after 120 days from planting.....	76
14.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on Bulb diameter (cm) of garlic after 150 days from planting.....	78
15.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on Chlorophyll reading(SPAD)of garlic after 120 days from planting.....	81
16.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB)on Chlorophyll reading (SPAD)of garlic after 150 days from planting.....	83
17.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on Total cured yield (ton) of garlic.....	85
18.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on bulb f. weight (g) of garlic.....	89
19.	Effect of irrigation after the depletion of different	

	percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on Bulb diameter (cm) of garlic.....	90
20.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on Neck diameters (cm) of garlic.....	92
21.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on Bulbing ratio of garlic.....	94
22.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on Cloves F.W. (g) of garlic.....	96
23.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on Cloves D.W. (g) of garlic.....	99
24.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K_2SiO_3) or glycine betaine (GB) on N. of Cloves /bulb of garlic.....	102
25.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate	

	(K ₂ SiO ₃) or glycine betaine (GB) on Average Clove W. (g) of garlic.....	104
26.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K ₂ SiO ₃) or glycine betaine (GB) on Cloves dry matter percent (%) of garlic.....	106
27.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K ₂ SiO ₃) or glycine betaine (GB) on outer cloves number of garlic.....	108
28.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K ₂ SiO ₃) or glycine betaine (GB) on Amino acid (g/100g D.W) of garlic.....	111
29.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K ₂ SiO ₃) or glycine betaine (GB) on Total soluble solids of garlic.....	113
30.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K ₂ SiO ₃) or glycine betaine (GB) on proline content (μmol/100g FW) of garlic.....	116
31.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate (K ₂ SiO ₃) or glycine betaine (GB) on Total sugars (g/100g D.W) of garlic.....	118

32.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate ((K_2SiO_3)) or glycine betaine (GB) on Ascorbic acid (g/100 g F.W) of garlic.....	121
33.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate ((K_2SiO_3)) or glycine betaine (GB) on Total soluble phenol (g/100g D.W) of garlic.....	123
34.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate ((K_2SiO_3)) or glycine betaine (GB) on Catalase activity (g /sec) of garlic.....	126
35.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate ((K_2SiO_3)) or glycine betaine (GB) on total carbohydrates (g/100g D.W) of garlic.....	128
36.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate ((K_2SiO_3)) or glycine betaine (GB) on Nitrogen content (%) of garlic.....	131
37.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil conditioner and foliar application of potassium silicate ((K_2SiO_3)) or glycine betaine (GB) on Phosphorus content (%) of garlic.....	133
38.	Effect of irrigation after the depletion of different percentages of available soil water depletion, soil	

conditioner and foliar application of potassium silicate
(K₂SiO₃) or glycine betaine (GB) on protein content %
of garlic..... 136