

ABSTRACT

Studies on growth and productivity of bottle gourd plant under different irrigation and fertilization levels.

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The experiment was carried out during the summer seasons of 2008 and 2009, at Al-Bousaily site, Al-Behaira governorate, Central Laboratory for Agricultural Climate (CLAC), on cv. local of bottle gourd plant. This study was established to investigate the effect of different water regimes (80, 100 and 120% using class A pan evaporation) and different nitrogen fertilization levels (40, 80 and 120 Kg N/ fed.) as well as their interaction on vegetative growth, chemical composition of plant foliage, fruit yield and its components, seed and oil yield as well as fatty acid content of oil. The high irrigation level (120% class A pan) gave the highest values of vegetative growth characteristics, i.e., plant length, number of leaves, number of branches, vine diameter, leaf area as well as fresh and dry weight of plant. In addition, the highest irrigation level gave the highest content of macro-nutrients, i.e., N, P and K but gave the lowest content for Ca and Mg. The number of days from transplanting to formation of first male flower, first female flower, harvest of edible and ripped fruits were increased by increasing irrigation level. Fruit yield and its components were increased by increasing irrigation level. Average 100-seed weight, seed yield, oil yield and content of unsaturated fatty acids (oleic, linoleic and linolenic) in both seasons. WUE was decreased by increasing irrigation level, the maximum WUE was obtained by using the lowest irrigation level (80% of class A pan). The lowest values of previous parameters were recorded with low irrigation level (80% class A pan). Nitrogen fertilization had a significant effect on the previous parameters. Application of 120 Kg N / fed. gave the highest values of vegetative growth parameters, fruit yield, seed yield, average 100-seed weight, oil yield and oil content of fatty acid. The lowest values resulted by the addition of 40 Kg N / fed. The interaction between irrigation and nitrogen fertilization

treatments was significant. The highest values of vegetative growth, fruit yield, seed yield as well as oil yield and its content were obtained by the combination between the highest irrigation level (120% of class A pan) and the highest nitrogen fertilizer level (120 Kg N / fed.)

Key words: Bottle gourd, Irrigation regimes, Nitrogen fertilization, Vegetative growth, Chemical composition, Fruits, Seeds, Seed oil, Fatty acid, Chromatogram analysis, WUE.

المستخلص

دراسات على نمو وإنتاجية نبات اليقطين تحت معدلات مختلفة من

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أجريت تجربة حقلية بموقع البوصيلي التابع للمعمل المركزي للمناخ الزراعي- مركز البحوث الزراعية خلال الموسم الصيفي لعامي ٢٠٠٨ و ٢٠٠٩ على نباتات اليقطين من الصنف المحلي وكان الهدف من الدراسة معرفة تأثير معدلات الري (٨٠، ١٠٠، ١٢٠% من معادلة حوض البخر) والتسميد النيتروجيني (٤٠، ٨٠، ١٢٠ كجم نيتروجين للفدان) والتفاعل فيما بينهم على النمو الخضري، التركيب الكيماوي للمجموع الخضري، التزهير، المحصول الثمري ومكوناته، المحصول البذري ومكوناته ومحصول الزيت وتركيبه من حيث المحتوى من الاحماض الدهنية. أدى استخدام معدل الري العالي (١٢٠% من معادلة حوض البخر) الى الحصول على اعلى القيم فى صفات النمو الخضري متمثلة فى طول النبات، عدد الاوراق، عدد الافرع، سمك الساق، مساحة سطح الورقة والوزن الطازج والجاف للنبات. كذلك أدى استخدام مستوى الري العالي الى زيادة محتوى الاوراق من العناصر الكبرى متمثلا فى النيتروجين، الفسفور، البوتاسيوم ولكن أعطى اقل محتوى من الكالسيوم والمغنسيوم. أدى استخدام مستوى الري العالي الى تاخر النبات فى تكوين الازهار سواء المذكورة او المؤنثة مما ادى الى طول الفترة اللازمة من الزراعة وحتى حصاد الثمار الخضراء والثمار الكاملة النضج. كما أدى الري العالي الى اعلى محصول للبذرة ومكوناته متوسط وزن ١٠٠ بذرة ومحصول الزيت ومحتواه من الاحماض الدهنية غير المشبعة (اوليك، لينوليك، لينولينيك) فى كلا موسمي النمو. ادى استخدام مستوى الري العالي الى انخفاض كفاءة استخدام الماء بينما ادى استخدام مستوى الري المنخفض (٨٠% من معادلة حوض البخر) الى الحصول على اعلى قيمة لكفاءة استخدام الماء. ادت معاملات التسميد النيتروجيني الى حدوث فروق معنوية فى جميع الصفات السابقة حيث ادى استخدام معدل التسميد النيتروجيني المرتفع (١٢٠ كجم نيتروجين للفدان) الى الحصول على اعلى القيم فى صفات النمو الخضري، محصول الثمار، محصول البذرة ومحصول الزيت ومكوناته. بينما أدى استخدام معدل التسميد النيتروجيني المنخفض (٤٠ كجم نيتروجين للفدان) الى الحصول على اقل القيم فى جميع الصفات السابقة. أدى التفاعل بين الري والتسميد النيتروجيني الى حدوث فروق معنوية وقد تحققت أعلى القيم فى النمو الخضري، محصول الثمار، محصول البذور ومحصول الزيت ومكوناته عند استخدام معدل الري العالي مع معدل التسميد النيتروجيني العالي.

الكلمات الدالة: اليقطين، معدلات الري، التسميد النيتروجيني، النمو الخضري، التركيب الكيماوي، الثمار، البذور، زيت البذور، الاحماض الدهنية، كفاءة استخدام الماء.

CONTENTS

Subject	Page
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	3
2.1. Irrigation	3
2.1.1. Effect of irrigation on vegetative growth characteristics.....	4
2.1.2. Effect of irrigation on chemical composition of plant foliage.....	5
2.1.3. Effect of irrigation on flowering and earliness characteristics	6
2.1.4. Effect of irrigation regimes on fruit yield and its components.....	7
2.1.5. Effect of irrigation on physical and chemical characteristics of fruits.....	9
2.1.6. Effect of irrigation on seed yield and its components.....	10
2.1.7. Effect of irrigation on seed oil yield and its components.....	11
2.1.8. Effect of irrigation on water use efficiency (WUE).....	12
2.2. Nitrogen fertilization	13
2.2.1. Effect of nitrogen on vegetative growth characteristics.....	13
2.2.2. Effect of nitrogen on chemical composition of plant foliage.....	15
2.2.3. Effect of nitrogen on flowering and earliness characteristics.....	16
2.2.4. Effect of nitrogen on fruit yield and its components.....	17
2.2.5. Effect of nitrogen on physical and chemical characters of fruits.....	19

2.2.6. Effect of nitrogen on seed yield and its components.....	20
2.2.7. Effect of nitrogen on seed oil yield and its components.....	21
2.2.8. Effect of nitrogen on water use efficiency	22
3. MATERIALS AND METHODS.....	23
3.1. Plant material	23
3.2. Soil properties.....	23
3.3. Experimental layout.....	24
3.4. Irrigation treatments.....	25
3.5. Nitrogen fertilization treatments.....	28
3.6. Recorded data	28
3.7. Statistical analysis	33
4. RESULTS AND DISCUSSION.....	34
4.1. Effect of water regimes, nitrogen levels and their interaction on vegetative growth of bottle gourd plant.....	34
4.2. Effect of water regimes, nitrogen levels and their interaction on chemical content of plant foliage of bottle gourd plant.....	47
4.3. Effect of water regimes, nitrogen levels and their interaction on flowering and earliness characteristics of bottle gourd plant.....	51
4.4. Effect of water regimes, nitrogen levels and their interaction on fruit yield and its components of bottle gourd plant.....	56
4.5. Effect of water regimes, nitrogen levels and their interaction on physical characteristics of fruit of bottle gourd plant.....	59
4.6. Effect of water regimes, nitrogen levels and their interaction on chemical characteristics of fruit of bottle gourd plant.....	61

4.7. Effect of water regimes, nitrogen levels and their interaction on seed yield and its components of bottle gourd plant.....	67
4.8. Effect of water regimes, nitrogen levels and their interaction on oil yield and its components of bottle gourd plant.....	69
4.9. Effect of water regimes, nitrogen levels and their interaction on fatty acid content of oil of bottle gourd plant.....	71
4.10. Effect of water regimes, nitrogen levels and their interaction on water use efficiency (WUE) of bottle gourd plant.....	73
5. SUMMARY AND CONCLUSION.....	81
6. REFERENCES.....	89
ARABIC SUMMARY	

LIST OF TABLES

No. of Table	Table	Page
1	Effect of different irrigation regimes, nitrogen level and their interaction on plant length (cm) of bottle gourd plant during 2008 and 2009 seasons.	35
2	Effect of different irrigation regimes, nitrogen level and their interaction on leaf number of bottle gourd plant during 2008 and 2009 seasons.	37
3	Effect of different irrigation regimes, nitrogen levels and their interaction on branch number of bottle gourd plant during 2008 and 2009 seasons.	39
4	Effect of different irrigation regimes, nitrogen level and their interaction on vine diameter (mm) of bottle gourd plant during 2008 and 2009 seasons.	41
5	Effect of different irrigation regimes, nitrogen levels and their interaction on leaf area, leaf fresh weight and leaf dry weight of bottle gourd plant during 2008 and 2009 seasons.	43
6	Effect of different irrigation regimes, nitrogen levels and their interaction on vine fresh weight, vine dry weight, plant fresh weight and plant dry weight of bottle gourd plant during 2008 and 2009 seasons.	45
7	Effect of different irrigation regimes, nitrogen levels and their interaction on leaf content of N, P, K, Ca, Mg and chlorophyll (SPAD reading) of bottle gourd plant during 2008 season.	48
8	Effect of different irrigation regimes, nitrogen levels and their interaction on leaf content of N, P, K, Ca, Mg and chlorophyll (SPAD reading) of bottle gourd plant during 2009 season.	49

No. of Table	Table	Page
9	Effect of different irrigation regimes, nitrogen levels and their interaction on sex ratio (male / female), days from transplanting to first male flower, first female flower, harvest edible fruit and harvest ripped fruit of bottle gourd plant during 2008 season.	52
10	Effect of different irrigation regimes, nitrogen levels and their interaction on sex ratio (male / female), days from transplanting to first male flower, first female flower, harvest edible fruit and harvest ripped fruit of bottle gourd plant during 2009 season.	53
11	Effect of different irrigation regimes, nitrogen levels and their interaction on total fruit yield and its components of bottle gourd during 2008 and 2009 seasons.	57
12	Effect of different irrigation regimes, nitrogen levels and their interaction on average fruit weight (g), average fruit length (cm) and average fruit diameter (mm) of bottle gourd plant during 2008 and 2009 seasons.	60
13	Effect of different irrigation regimes, nitrogen levels and their interaction on edible fruit content of N, P, K, Ca and Mg during 2008 season.	62
14	Effect of different irrigation regimes, nitrogen levels and their interaction on edible fruit content of N, P, K, Ca and Mg of bottle gourd during 2009 season.	63
15	Effect of different irrigation regimes, nitrogen levels and their interaction on edible fruit content of TSS, fibers, carbohydrates and vitamin C of bottle gourd during 2008 season.	65

No. of Table	Table	Page
16	Effect of different irrigation regimes, nitrogen levels and their interaction on edible fruit content of TSS, fibers, carbohydrates and vitamin C of bottle gourd during 2009 season.	66
17	Effect of different irrigation regimes, nitrogen levels and their interaction on average 100 seed weight (g), seed yield gm /plant and seed yield (Kg)/ fed. of bottle gourd during 2008 and 2009 seasons.	68
18	Effect of different irrigation regimes, nitrogen levels and their interaction on seed oil content, seed oil yield (g) /plant and seed oil yield (Kg) /fed. of bottle gourd during 2008 and 2009 seasons.	70
19	Effect of different irrigation regimes, nitrogen levels and their interaction on main fatty acid components of seed oil of bottle gourd during 2008 and 2009 seasons.	72
20	Effect of different irrigation regimes, nitrogen levels and their interaction on water use efficiency (WUE) Kg/ m ³ of irrigation water for fresh fruits, seeds and oil of bottle gourd during 2008 and 2009 seasons.	74

LIST OF FIGURES

No. of Figure	Figure	Page
1	Effect of different irrigation regimes on fruit, seed and oil yield of bottle gourd plant during 2008 season.	71
2	Effect of different irrigation regimes on fruit, seed and oil yield of bottle gourd plant during 2009 season.	71
3	Effect of different nitrogen fertilizer levels on fruit, seed and oil yield of bottle gourd plant during 2008 season.	72
4	Effect of different nitrogen fertilizer levels on fruit, seed and oil yield of bottle gourd plant during 2009 season.	72
5	Effect of 80% class A pan irrigation treatment on chromatogram analysis of oil content of fatty acids	75
6	Effect of 100% class A pan irrigation treatment on chromatogram analysis of oil content of fatty acids	75
7	Effect of 120% class A pan irrigation treatment on chromatogram analysis of oil content of fatty acids	76
8	Effect of 40 Kg N /fed. fertilizer level on chromatogram analysis of oil content of fatty acids	76
9	Effect of 80 Kg N /fed. fertilizer level on chromatogram analysis of oil content of fatty acids	77
10	Effect of 120 Kg N /fed. fertilizer level on chromatogram analysis of oil content of fatty acids	77

ABBREVIATION

AWD	= Available water deficit
CPE	= Cumulative pan evaporation
Ca	= Calcium
dS / m	= Desi Siemens per meter
EC	= Electrical conductivity
Eto	= Reference evapotranspiration
Etc	= Crop evapotranspiration
Epan	= Pan evaporation
FC	= Field capacity
fed.	= Feddan (4200 m ²)
g	= Gram
ha	= Hectare (10000 m ²)
hPa	= Soil water pressure in related to atmospheric pressure
K	= Potassium
Kc	= Crop coefficient
Kcp	= Plant- pan coefficient
Kg	= Kilo gram (1000 grams)
L.S.D	= Least Significant Difference
Mg	= Magnesium
mm	= Millimeter
N	= Nitrogen
P	= Phosphorus
ppm	= Part per million
%	= Percentage
TSS	= Total soluble solids
WUE	= Water use efficiency