RESPONSE OF AL-HSSAWI AND CHINESE GARLIC CULTIVARS TO PLANTING METHOD , GIBBRELLIC ACID ,BORONO, AND INDOL ACETIC ACID

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Abstract

Studies on growth, yield and N,B and K in Al-Hassawi andChinese garlic CVS were carried out during 1997/1998 and 1998/1999 season, Seedling were soaked for 30 minutes in gibbrellic acid (75and 150 ppm) indole acetic acid (500 and 1000 ppm) and boron (50 and 100 ppm) . Cloves methods culture was included for comparison with seedling planting methods. All treatments gave a significant increase in plant height, dry/fresh weight %, number of cloves/bulb, average bulb weight, total yield,and N,B and K content of leaves in both seasons .Cloves planting method gave 800.0 gm bulb weight /plant of Al-Hassawi cultivar and 1200 gm bulb weight/plant of Chinese cultivars, while seedling planting methods treatment with GA_3 at 150 ppm gave 775.0 gm bulb weight/plant of Al-Hassawi cultivars and 1088.0 gm bulb weight/plant of Chinese cultivars.

Finally, cloves planting method and seedling methods after soaking with GA_3 at 150 ppm (30minutes) coulde be useful for inhancing garlic bulb yield and it's quality. Seedling methods might be recommended to decrease the period of the garlic growth in field by about two months which woulde decrease the area devoted for garlic production.

Introduction

Garlic plant is usually grown in saudi arabia during the autumn and winter seasons. Garlic plant is the most important vegetable and medical plants in saudi arabia, but it takes long time in field ,when it grown by using planting culture method .However ,it takes short time in field by applying some growth regulators and boron of seedling method to encourage root system formation .

However ,few investigators have used these methods in garlic producation .In these paragraphs we will review some articles dealing with garlic and other crops specially onions .In this respect, Deore and Bharud (1991) treated onion cv N-2-4-1 seedling with GA3 (30 or 60 ppm) or NAA (10-20ppm) as root dip for 24 hrs before transplanting found that GA3 at 60 ppm as root dip resulted in the greatest plant groth and yield after adding NAA at 200 ppm .Anuradha et al .(1991)found that seeds of onion cv Pusa red soaked in 100 ppm GA3 soluation for 4 hrs at 25^0c germinated rapidly and germination percentage , plant growth and bulb yield were increasd. Lioret and Pulgarin (1992) found that the onion cv French treated with 105 and 10-4 NAA as soaking the entire root system (10 roots /bulb) in 1 liter of auxin soluation for 24 or 48hrs resulted in greater root number , length of root, groth and yield. Chermsiri et al .(1995) found that boron application increased the yield of garlic by 24-40% compared with untreated plants and this treatment also produced the largest and heaviest cloves. Francois (1991) found that using boron above 8-9 to 20 mg/liter with culture soluations increased garlic bulb wight and diameter and yield .Miroschmichenko and Manankov (1991) found that GA3 at 1-500 mg / liter reduced the content of chlorophyll and had avariable influence on carotenoids of onion . Skhon and Singh (1984) found that soaking the potato tubers in 10 mg GA3 /1 liter for 15 min before planting resulted in increasing the tuber yield by 2.65 ton/ha ,tuber size and the stem length . Agruello et al (1986) found that treated garlic cloves with GA3 increased root and shoot growth and rapid the rate of bulb formation Hamail ,A.F(1996) found that cloves planting

method and seedling method after soaking with GA_3 at 100 ppm (5 hours) could be useful for enhancing garlic bubl yield and it's quality.

Materials and methods

Two field experments were carried out during two successive seasons (autumn of 1997/1998 and 1998/1999) at the Agricultural research station king faisal university Al-Hassawi and Chinese cultivars were used. Garlic seedling were transplanted at 60 days of age on the 29th December 1997 and 1998. spilt plot desing with 4 replicates was used. The chemical used were Gibbrellic acid (GA_3) at 75 and 150 ppm and boron (B) at 50 and 100 ppm (source from boric acid) and indol acetic acid (IAA) at 500 and 1000 ppm. The seedling have been soaked (30 minutes) befor transplanted. A control treatment has been soaked in tap water , colves were sown in nursery on 18th October 1997/1998. The plot area was 2,4 x 5 m containing 4ridg and the space between plant was 12 cm. Ten plants were taken at random from each plot after 65 days from planting to determine plant height, fresh and dry weight, number of cloves/bulb, average bulb weight and to evaluate the (N) (P)and (K) content of plants. Total N was determind in plants samples, according to Pregl (1945) Phosphorus was determind colorimtrically as described by (Jackson 1967). Potassium was estimated by using a flame photomateter by (Jackson 1967).

All data were statisically analyzed according to the procedure out lined by Snedecor and Cochran (1967).

Results and discussion

Vegetative growth:

Data in table (1) show that cloves method singificantly increased plant height, and fresh/dry weight % while GA_3 at 150 ppm gave the good results in all growth measures. The resultes reported in this study are in line with those found by many investigators. Deore and Bharud (1991) who found

that onion seedling soaked in 60 ppm GA_3 for 24 hours as root dip before transplanting resulted in greatest plant growth and reference 2,9 of Garlic and Onion plants.

Yield and its components:

In table (2) the resultes showed that clove method and soaking seedling method in 150 ppm GA_3 significantly increased number of cloves per bulb, average bulb weight and total garlic yield in two cultivars as compared with control, while Chinese cv was higher in yield as compared with Al-Hassawi cv. Similar result was also obtianed by Francios (1991) who found bulb weight, diametr and yield of garlic were increased after added boron at 20 mg/liter and similar reslute in 2,3.4.8.9.12 on garlic and onion plants.

N,P and K contents of leaves:

Date in table (3) shown that N,P and K% of garlic leaves were increased in case of clove method and seedling treated with GA3 150 ppm in the two garlic cultivars (Chinese and Al-Hassawi). Similar resulte was obtained by sharmo et al. (1988) who found that garlic leaves contents of Ca, Mg, Cu, B, Zn, Mn and Mo after sprayed with GA3 at 100 ppm.

Table (1) Effect of GA,B and IAA on plant height and fresh/dry weight on Al-Hassawi and Chinese garlic cultivars as average of two seasons

Treatment (ppm)	Plant hieght (cm)		Fresh/ dry weighte %	
	Al-Hassawi	Chinese	Al-Hassawi	Chinese
1.$GA_{3\ 75\ ppm}$	48.33	47.33	37.00	23.33
2.$GA_{3\ 150\ ppm}$	46.33	36.00	30.66	27.33
3.B 50	46.00	42.00	34.00	26.00
4.B 100	44.66	41.60	33.33	25.33
5.IAA 500	44.33	40.00	33.33	24.33
6.IAA1000	44.00	37.00	31.66	24.00

7.colves	46.33	47.33	37.00	28.66
8.control	38.33	36.00	29.66	23.00
LSD at 5%	4.227	2.957	2.755	1.725

Table (2) Effect of GA, B and IAA on number of cloves/bulb, bulb weight and total garlic yield of Al-Hassawi and Chinese garlic cultivars as average of two seasons

Treatment	No.of cloves bulb		Bulb weight (gm)		Total yield gm/m	
	Al-Hassawi	chinese	Al-Hassawi	chinese	Al-Hassawi	chinese
1. GA3 75 PPM	14.3	14.00	25.3	33.6	683.33	841.0
2. GA3 150 PPM	17.0	18.3	29.0	43.0	775.0	1088.0
3.B 50	17.00	18.3	28.3	43.0	758.33	1068.0
4.B 100	16.6	17.3	27.6	38.0	741.67	966.6
5.IAA 500	15.6	17.3	27.0	38.3	725.00	958.3
6.IAA1000	14.6	15.00	25.3	34.0	683.33	850.00
7.colves	21.3	18.3	32.30	48.0	800.00	1200.0
8.control	12.3	13.0	22.0	29.6	550.0	700.0
LSD at 5%	1.56	.96	2.3	4.01	59.182	83.1

From the results discussed above clove method which produced 800 mg bulb/plant of Al-Hassawi cv and 1200 gm bulb/plant of Chinese cv and seedling method after soaking in GA_3 at 150 gm which produced 775.00 gm bulb/plant of chinese cv and at 75 ppm which produce 758.33 gm bulb/plant of Al-Hassawi cv and 1068.0 gm bulb/plant of Chinese cv proved to be the best for increasing garlic production. Moreover , seedling planting method could lead to reduce the area devoted for garlic production, being seedlings last for some two month in the nursery.

N,P and K contents of leaves :

Data in table (3) shown that N,P and K % of garlic leaves were increased in case of clove method and seedling treated with GA_3 150 ppm in the two garlic cultivars (Chinese and AL-Hassawi). Similar resulte was obtained by sharmo et al.(1988)who found that garlic leaves contents of Ca,Mg,B,Zn,Mn and Mo after sprayed with GA_3 at 100 ppm.

Table (3) Effect of GA,B and IAA on N,P,K content of garlic leaves as average of two seasons

Treatment	N%		P%		K%	
	AL-HASSAWI	Chinese	AL-HASSAWI	Chinese	AL-HASSAWI	Chinese
1.$GA_{3\ 75\ PPM}$	1.89	1.72	0.26	0.25	1.73	1.78
2.$GA_{3\ 150ppm}$	2.55	3.06	0.33	0.32	2.22	2.15
3.B 50	2.27	22.4	0.32	0.31	2.13	2.14
4.B 100	2.27	2.18	0.30	0.29	1.92	1.90
5.IAA 500	2.11	2.11	0.29	0.28	1.87	1.90
6.IAA1000	1.90	1.92	0.27	0.26	1.86	1.79
7.colves	3.37	3.32	0.35	0.34	2.76	2.62
8.control	1.84	1.65	0.26	0.24	1.73	1.64
LSD at 5%	0.241	0.115	0.018	0.013	0.114	0.074

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استجابة صنفى الثوم الحساوى والصينى لطريقة الزراعة والنقع فى الجبرلين والبورون واندول حمض الخليك

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الملخص :

اجريت دراسات على النمو و المحصول فى صنفى الثوم الحساوى والصينى ومحتوى اوراقهما من الازوت والفوسفور والبوتاسيوم وذلك خلال موسمى ١٩٩٨/١٩٩٧ ، ١٩٩٩/١٩٩٨. حيث تم نقع الشتلا ت التى عمرها ٦٥ يوم لمدة ٣٠ دقيقة فى كلا من الجبرلين بتركيز ٧٥,١٥٠ جزء من المليون ، واند ول حمض الخليك بتركيز ٥٠٠ ، ١٠٠٠ جزء من المليون والبورون بتركيز ٥٠ ، ١٠٠ جزء في المليون بالاضافة الى زراعة الفصوص مباشرة مع زراعة شاهد (كنترول) من الشتلات بدون غمر فى منظما ت النمو . اعطت كل المعاملات زيادة معنوية فى طول النبات، الوزن الجاف / الوزن الطازج، عدد الفصوص فى البصلة، متوسط وزن البصلة، المحصول الكلى ومحتوى الاوراق من الازوت والفسفور والبوتاسيوم فى كلا الموسمين . اعطت طريقة الزراعة بالفصوص مباشرة بصلة بوزن ٨٠٠ جم / نبات من الثوم الحساوى بينما الثوم الصينى اعطت ابصال بوزن ١٢٠٠ جم / نبا ت، بينما النباتات المزروعة بالشتلات والتى غمست فى الجبرلين تركيز ١٥٠ جزء في المليون اعطت ٧٧٥ جم للنبات من الصنف الحساوى بينما الصنف الصينى اعطت ١٠٨٨ جم وزن للنبات.

واخيرا يمكن القول بان طريقة الزراعة بواسطة الفصوص مباشرة وطريقة زراعة الشتلات بعد غمرها فى الجبرلين بتركيز ١٥٠ جزء فى المليون لمدة ٣٠ دقيقة اعطى افضل النتائج فى زيادة محصول رأس الثوم وجودتها، ويمكن التوصية باستخدام طريقة الشتل وذلك بغرض تقليل فترة مكث الثوم فى التربة بحوالى شهرين وبالتالى يمكن تقليل المساحة التى يشغلها الثوم من الارض واستغلالها فى زراعات اخرى.