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Response of cotton plant to the indole-3-butyric acid application under n fertilization rates.

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Abstract

Two field experiments were carried out during 2011 and 2012 seasons at Sids Agricultural Research Station. ARC, using cotton cultivar Giza 80 to study the effect nitrogen fertilizer rates (45, 60 and 75kg/fed) and foliar spraying of indole -3- butyric acid (IBA) at four rates (0, 10, 20 and 30 ppm) on growth characters, yield and yield components as well as fiber properties and chemical contents. Increasing nitrogen fertilizer rates from 45 to 60 or 75 kg/fed significantly increased for plant height, number of internodes/plant, internode length, number of fruiting branches/plant, boll setting percentage, number of open bolls/plant, boll weight, earliness percentage, seed cotton yield (Kentar/fed) and chemical contents of cotton plant (leaves and seeds). On the other hand, position of first fruiting node and fiber properties showed insignificant responded to nitrogen fertilization. Result revealed that the IBA at 20 ppm was significantly enhanced plant height, No. of internodes/plant, internode length, boll setting %, No. of open bolls/plant, boll weight, seed cotton yield, chlorophyll (A), carotenoids, protein and oil percentage. On other hand, position of first fruiting node, fiber properties, chlorophyll (B) and total chlorophyll. However, No. of fruiting branches and earliness % response only in one season. Generally, the interaction between N and IBA had highly significantly affected all studied characters, except position of first fruiting node, yield and yield components and chemical contents as well as (leaves and seeds) of cotton plant were not affected by the interaction between treatments with refer to apply 75kg N/F and spraying 20ppm IBA.

Key words: Cotton, Indole -3- butyric acid (IBA), N fertilizer rates, Growth characters, Yield components, Yield, Pressley index, Micronaire reading and Chemical contents.

Introduction

Nitrogen is one of the most important nutrients for plants. Although, nitrogen is an essential nutrient for cotton that effect plant growth, fruiting, and yield. The response of cotton plants to nitrogen application is widely varied due to cotton varieties, soil fertility and environmental conditions. **Makram et al. (1994)** found that nitrogen doses had little effects on plant growth, number of open bolls, boll weight, seed cotton yield/plant, lint percentage and seed index, while earliness yield were increased in favor of lower nitrogen doses. **El-Debaby et al. (1995)** reported that number of fruiting branches, total and open boll number and seed cotton yield were increased by increasing N level, while earliness percentage had reverse trend. **Abdel El-All et al. (1990)** found that N rates had no effect on number of fruiting branches/plant, boll weight and yield /plant, while number of open bolls/plant and yield/fed were increased by increasing N level to 75 kg/fed. The addition of N fertilizer was found to be profitable up to recommended rate (75 kg/fed) which increased plant height, number of fruiting branches, number of open bolls/plant, boll weight, lint% and cotton yield **(Abuldahab et al, 2000)**. **Dober man et al. (2005)** found that 120 kg/ha resulted in the tallest cotton plant. **Reddy et al. (2007)** and **Reddy and Gopinath (2008)** reported that cotton plant did not responded to increasing nitrogen levels up to 120 kg/ha concearning number of sympodia/plant. Recently **Seadh et al. (2012)** indicated that leaf area index, total dry weight/plant, plant height and number of fruiting branches/plant were significantly increased by increasing N rate.

Indole-3-butyric acid (IBA) play important roles in all phases of plant development, cotton plant can not reach to maximum potential without the crosses ponding improvement in agronomic practices. The additions of chemical hormones appear to hold promise for the production of high yield. **Sawan (1978)** stated that The boll weight and seed cotton yield significantly increased when cotton plant sprayed with 5 or 10 ppm at 55, 70 and 85 days from sowing. However, IBA had no significant effects on lint percentage, fiber length and micronaire value. **Abdallah and Shalaby (1980)** concluded that IBA application to cotton plants at concentrations of 50 ppm produced the highest number of seeds/boll and yield/plant, while the highest number of seeds/bolls was obtained by the application of a concentration of 100 ppm, IBA also tended to increase the dry weight of leaves of treated plants. **Abedel El-All et al. (1990)** study the effect of application of IBA (0,5,10,20 ppm) as foliar spray on cotton leaves of Giza 81 cultivar either at squaring or flowering stage, the results showed that application of IBA in general increased flower and boll production at both times of application and decrease the shedding percentage of young bolls. Application of IBA increased number of open bolls, seed cotton yield/plant, lint percentage and seed index and no effect on fiber properties. The

application of IBA at flowering stage increased carotenoids content when applied at higher concentration. **Volpert et al. (1995) and Arnaidos et al. (2001)** explained the effect on plant growth to the promoting effect of IBA on cell division and its differentiation but not on biomass production after rooting. They added that phenolics are modulators of IBA catabolism. Some monophenols like synaptic acid and ferulic acid, at low concentration inhibit enzymatic oxidation. **Sawan (1986)**, found that the influence of nitrogen rates (72, 144 or 216 kg N/ha) and IBA sprayed at 10 ppm at three times 70, 85 and 100 days after sowing increased number of bolls/plant, boll weight, seed cotton yield, while lint percentage decrease by raising N level.

Materials and Methods

Two field experiments were conducted at Sids Agriculture Research Station (Beni-Suef Governorate) in two successive seasons (2011 and 2012) to study the response of cotton plant to the indole-3- butyric acid (IBA) application under N fertilization rats on growth yield and its components of Giza 80 cotton cultivar as well as, fiber properties and chemical contents. The experimental soil analysis were: clay loam in texture with Ph (8.00 and 7.80), organic matter (1.40 and 1.30%), $CaCl_3$ (2.47 and 3.1%), EC (0.75 and 0.65 ds/m), available N (20 and 17 ppm), available P (13.1 and 10.2 ppm), available K (180 and 225 ppm) in both seasons, respectively. These soil properties were carried out according to **Chapman and Pratt (1981)**. The experimental design was split-plot with four replications. The main plots were devoted to the N rates, while the indole -3- butyric acid (1BA) doses treatments were randomly distributed in the sub-plots.

Experimental factors:

a) Nitrogen fertilization: Nitrogen rates (45, 60 and 75kg/fed) were added in the main plots as ammonium nitrate 33.5% N at two equal doses at thinning and one month later.

b) Indole -3- butyric acid (IBA): (10, 20 and 30 ppm) of indole -3-butyric acid were sprayed twice to cotton plant at start of flowering and at peak of flowering in sub plots.

Each sub-plot included 5 ridges 60 cm apart and 4m long. The sub-plot area was 12 m^2, sowing date at the first week of April in the two seasons. Other cultural practices were done as recommended for cotton production. Ten plants were chosen randomly from each plot at harvest to estimate the following:

a- Growth characters

1- Plant height (cm)
2- Position of first fruiting node
3- Number of internodes/plant
4- Length of internode (cm)
5- Number of fruiting branches/plants.

b- Yield and Yield components

1- Number of open bolls/plant.
2-Boll setting percentage, calculated from the following equation according to Boll setting percentage = [(number of total bolls/plant)/(number of total fruiting sites/plant)] ×100.

Richmond and radwan (1962).

3- Boll weight (BW): determined the average weight of 25 bolls in grams.
4- Earliness percentage: calculated from the following equation: earliness percentage = (yield of first pick/total yield) × 100.
5- Seed cotton yield (Kentar/fed).

c- Fiber properties:

1- Pressley index: was determined using the instrument as reported by **(A.S.T.M 1979).**
2- Micronaire reading: measured by micronaire apparatus and expressed in standard micronaire units **(May and Bridges 1995).**

d- Chemical contents:

In leaves:

Leaves sample per experimental plot was taken at random from the top fourth node leaves 15 days after the last spraying treatments only in the second season (2012) to determine the following chemical analysis.
1- Chlorophyll A and B: were determined according to the method described by **Arnon (1949)**.
2- Carotenoids content was determined according to method described by **Rolbelen (1957).**

In mature seeds:

1- Protein percentage was calculated as stated by **A.O.A.C. (1975).**
2- Oil percentage was determined according to **A.O.A.C. (1975).**

Statistical analysis:

The analysis of variance for both seasons was carried out according to the procedure described by **Snedecor and Cochran (1989)**. L.S.D test at 0.5% level was used to compare between means of the main factors and their interactions.

Results and Disscion

1. Growth characters:

A- Nitrogen fertilizer:

Results in table (1) show that plant height was significantly affected by the application of nitrogen fertilizer in both seasons. Application of 75 kg N /fed introduced the tallest plants as well as highest values of internode length, number of fruiting

branches/plant and setting percentage in the two seasons. These finding consider with the fact that the N is an essential nutrient in building the plant dray matter as well as many energy-rich compounds which regulate photosynthesis **(Wankade and Kene 1990 and Ismail et al. 2000).** While, the position of first fruiting node/plant was not affected by nitrogen treatments in both growing seasons. On the other hand, application of 60 kg N/fed produced the highest values of number of fruiting branches/plant were in the first season and number of internodes/plant. The increase of some growth characters of plants, i.e. plant height, number of internode/plant, internode length, number of fruiting branches/plant and boll setting percentage could be attributed to stimulation of cell division and elongation of the new cells growth which formed especially apical meristems, consequently increasing the plant height and the hormones levels in plant tissues especially the IAA and GA, **(Wood ruff et al .1987 and Albers et al. 2008)**

B- IBA concentrations:

The data in table (1) reveal that plant height, number of internodes/plant, internode length (cm), no. of fruiting/plant and boll setting percentage were significantly affected by IBA of foliar spraying at start of flowering stage in both growing seasons. On the other hand, the position of first fruiting node was insignificantly affected by IBA treatments. It is appear that the highest values of growth characters were produced under 20 or 30ppm IBA treatment. The increase in growth characters by added IBA may be due to the positive effect of IBA on increasing the dry matter production of leaves consequently enhance the growth characters of cotton plant **(Abdallah and Shalaby 1980)**. Also, **El Haymow et al (1975) and Abdallah (1982)** added that the highest dry weight of leaves at harvest which obtained from plants treated with 20ppm IBA was related to production of leaves as reported by **Abdallah and Shalaby (1980**). Treated plants by IBA increased the setting percentage of young developing bolls, that the reduction in shedding of young boll was connected with an increase in the total phenols and poly phenols contents in young boll. This results was similar to these obtained by **Abdel-Al et al. (1989)** who indicated that the reduction of young boll shedding may be due to the indirect effect of polyphenols in inhibiting the action of IAA oxidase.

C- The interaction between nitrogen and IBA treatments:

Regarding the effect of interaction between nitrogen fertilizer and IBA concentration, from the results in table (1) it is evident that all studied growth characters, except the position of first node were significantly affected by resulted and highest values of plant height, internode length and boll setting% were associated or recorded by fertilization with 75 kg N /fed and spraying by 20 ppm IBA, while the highest values of number of internodes/plant and number of fruiting branches/plant were recorded by fertilization with 60 kg N/fed and spraying by 20ppm IBA. On the other hand, the plants received 45 kg N/fed without IBA application recorded the lowest values of the all studied growth parameters.

2- Yield and yield components:

A- Nitrogen fertilizer:

Results in table (2) showed that numbers of open bolls/plant were significantly affected by nitrogen level in both growing seasons. Applying 75 kg N/fed gave the highest values of number open bolls/plant and boll weight. This result may be due to increasing nitrogen fertilizing enhancing photosynthesis and plant metabolism and also to the fact that nitrogen acts as an activator of some enzymes which may affect boll formation and stability. Similar results were obtained by **(Abou -El-Nour et al. 1998)**. As for seed cotton yield, the increasing of cotton yield resulted by addition of 75 kg N/fed may be due to raising nitrogen level increasing number of open bolls/plant and boll weight as discussed before, consequently increased seed cotton yield **(Ismail et al 2000).** Earliness percentage was significantly affected by nitrogen application in both growing seasons. The highest earliest yield were obtained from the plants received the lowest nitrogen level (45 kg/fed). These results may be due to the negative high N application could ultimately extend the period of vegetative plant growth and thus fairly delay the onset of fruiting stage **(Ismail and Esmail 1987)**.

With respect to Presley index and Micronaire reading, data in table (2) indicated that these characters were not significantly affected in both seasons by application of nitrogen rate. These results are in harmony with those obtained by **Sawan et al (1997) and Ismail et al (2000)**.

B- IBA concentrations:

Data presented in table (2) revealed that number of open bolls/plant, boll weight and seed cotton yield were significantly affected by IBA concentration in both seasons. The highest values were obtained from spraying 20 ppm at of IBA flowering stage. The positive effect of IBA on number of bolls/plant and boll weight, then on seed cotton yield is mainly due to its effected on growth parameters as mentioned before table (1). Apparently from table (2), that earliness percentage was affected by IBA application in the two studied seasons. The highest earliest yields were obtained from plants spray with 20ppm IBA. Presley index and Micronaire reading were not significantly affected by IBA treatments in both growing seasons (table 2).

C - Interaction between nitrogen fertilizer and IBA treatments:

Results recorded in table (2) indicate that nitrogen fertilizer × IBA connectration (A×B) exhibited significant effect on number of open bolls/plant, boll weight and seed cotton yield in both seasons. The highest values were obtained from applying 75Kg N/fed and 20 ppm IBA twice at flowering stage. With regard to the effect of the interaction between nitrogen level and IBA (A×B) on earliness percentage, it could be noticed from table (2) that earliness percentage was significant affected by this interaction in both growing seasons. The highest values were obtained from addition of 45 kg N/fed and 20ppm IBA. Data in table (2) show that Presley index and Micronair reading were not affected by the interaction between nitrogen fertilizer and IBA in both growing seasons.

3- Chemical contents:

A- Nitrogen fertilizer:

The result indicate that chlorophyll (A) or/and (B) and carotenoids concentration as (mg/g dw) of cotton leaves were significantly affected by nitrogen fertilizer (table 3). The highest values (5.10, 3.46, 8.56 and 0.90 mg/g dw) were obtained from appling 75 kg N/fed. **Wahdan (1990) and Azab et al. (1993)** indicated that 100 kg N/fed increased chlorophyll A, B, A + B and carotenoids. They mentioned that increasing nitrogen fertilizer increases the biosynthesis and accumulation of chloroplast pigments (chlorophyll A, B and carotenoids). With regard to protein and oil percentage results in table (3) show that was significantly affected by nitrogen in mature seeds. The highest values of protein and oil percentages were recorded by addition of 75 kg N/fed in this study.

B. IBA concentration:

Results in table (3) show that chlorophyll (A) and carotenoids contents in leaves (mg/g dw) were significantly by affected spraying IBA. The highest values (4.68 and 0.84 mg/g dw) recorded from spraying 20 ppm IBA. Similar results were obtained by **Abd el-All et al. (1989)** who found that spraying cotton with 20ppm IBA increased pigments in leaves plant. The accumulation of more pigments in plants treated with IBA may be due to higher utilization of such material in metabolism or increasing translocation rate from leaves to the developing plant organs. Concerning the effect of IBA concentration on chlorophyll (B) and (A+B) data in table (3) clear that IBA concentration had no significant effect. Table (3) clearly show that portion and oil percentage were significantly affected by IBA treatment. The highest values (25.91 and 18.91%, respectively) obtained from spraying 20 ppm IBA.

C- The interaction between nitrogen and IBA treatments:

The results in table (3) indicated that chlorophyll A or/and B and carotenoids content in leaves of cotton plant were significantly affected by the interaction between nitrogen fertilizer and IBA treatment. The highest values (5.54, 3.71,9.25 and 0.91 mg/g dw) were obtained from applying 75 kg N/fed and spraying 20 ppm IBA twice at flowering stage and peck of flowering. With reference to table (3), it could be seen that interaction between nitrogen fertilizer and IBA concentration (A×B), exhibited significant effects on protein and oil percentage in mature seeds. The highest values (29.11 and 19.44%) were recorded from applying 75 kg N/fed and 20ppm IBA spraying at flowering stage and peck of flowering. It is evident from the obtained results that cotton plant in this study is preferred to nitrogen rates and IBA suitable climatic condition which enhance the physiological processes and improve activates of some specific enzymes which enhance the accumulation and composition of these chemical contents, i.e. chlorophyll A, B, A+B and carotenoids in leaves, protein and oil percentage in mature seeds **(Sawan 1978)**.

Conclusion

It can be concluded from the previous results that cotton plants (G.80 varity) which received high level of N application/fed (75K N/fed) combined with 20 ppm of IBA gave the height records. Values of studies characters *i.e.* (plant height, position of first fruiting node, internode length, No. of fruiting branches and boll setting%, yield and yield components in addition to optimally observed chemical concentration of leaves and seeds (Chl a, Chl b, total Chl, Carotenes, protein% and oil%). All of these characters shared consequently in raising physiological processes and enhancing chemical metabolism indicate the plants and finally inverted into high seed cotton yield / fed.

Table 1. Effect of N fertilization and IBA and their interaction on cotton in 2011 and 2012 seasons.

A	B	Plant height (cm)		Position of first fruiting node		No. of internodes / plant		Internode length (cm)		No. of fruiting branches / plant		Boll setting %	
		2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
45KN/Fed	Control	112.5	123.1	8.9	8.5	22.1	22.3	4.7	5.0	13.8	14.1	60.6	73.1
	10ppm	119.1	124.1	9.1	9.0	22.7	24.3	4.9	4.5	14.1	14.9	72.4	73.7
	20ppm	119.4	128.4	8.5	8.8	23.4	23.5	5.0	5.0	14.5	15.1	74.4	74.4
	30ppm	121.9	132.2	9.0	8.7	23.8	24.7	5.0	4.8	15.0	15.1	76.2	74.6
	Mean	**118.2**	**127.0**	**8.9**	**8.8**	**23.0**	**23.6**	**4.9**	**4.8**	**14.3**	**14.8**	**70.9**	**74.0**
60KN/Fed	Control	114.7	123.7	8.6	9.0	22.6	23.9	5.1	4.6	14.0	13.9	71.6	74.3
	10ppm	119.3	132.5	8.8	9.1	23.2	24.0	5.1	4.9	14.4	14.5	71.8	75.0
	20ppm	120.3	138.3	8.9	8.8	23.5	23.2	5.1	5.3	14.9	15.9	72.7	76.4
	30ppm	122.2	140.4	8.7	8.9	23.7	23.9	5.2	5.2	15.2	15.6	73.4	77.6
	Mean	**119.1**	**133.7**	**8.8**	**9.0**	**23.3**	**23.8**	**5.1**	**5.0**	**14.6**	**15.0**	**72.4**	**75.8**
75KN/Fed	Control	115.5	133.4	8.6	9.1	24.0	23.7	5.1	5.2	14.5	14.2	74.9	74.2
	10ppm	122.2	135.0	8.7	8.8	24.0	23.5	5.2	5.4	14.9	15.3	75.5	76.2
	20ppm	125.3	138.7	8.8	9.0	24.3	22.1	5.6	5.5	16.0	16.2	80.8	79.7
	30ppm	129.4	143.7	9.0	8.6	23.8	23.4	5.5	5.3	15.5	15.9	83.5	83.8
	Mean	**123.1**	**137.7**	**8.8**	**8.9**	**24.2**	**23.2**	**5.3**	**5.3**	**15.2**	**15.4**	**78.7**	**78.5**
Mean of IBA	Control	114.2	126.7	8.7	8.9	22.9	23.3	5.0	4.9	14.1	14.1	69.3	73.9
	10ppm	120.2	130.5	8.9	9.0	23.3	23.9	5.1	4.9	14.5	14.9	73.2	75.8
	20ppm	121.7	135.1	8.7	8.9	23.7	22.9	5.2	5.3	15.1	15.8	76.0	78.5
	30ppm	124.5	138.8	8.9	8.7	23.8	24.0	5.2	5.1	15.2	14.5	77.7	76.1
						LSD 0.05							
A		2.42	0.67	NS	NS	0.95	0.56	0.39	0.39	0.36	0.21	7.15	0.69
B		2.34	0.43	NS	NS	0.35	0.42	0.27	0.21	0.20	0.24	6.32	2.37
A×B		7.03	1.28	NS	NS	0.61	0.73	0.48	0.37	0.60	0.73	10.94	4.10

Table 2. Effect of the interaction between nitrogen (A) and indol-3-butric acid (IBA) (B) on yield and yield components and fiber properties of cotton plant (Giza 80) in 2011 and 2012 seasons.

A	B	No. of open bolls / plant		Boll weight (g)		Earliness %		Seed cotton yield (K/Fed)		Pressley index		Micronaire reading	
		2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
45KN/Fed	Control	15.9	11.5	2.60	2.48	63.74	70.62	10.00	8.06	9.3	10.1	4.5	4.5
	10ppm	16.3	12.6	2.66	2.61	65.71	73.69	11.00	9.21	9.7	9.3	4.5	4.5
	20ppm	17.4	15.5	2.66	2.61	69.91	77.05	11.91	10.86	11.0	11.0	4.5	4.5
	30ppm	16.3	15.2	2.64	2.60	96.85	66.21	11.80	10.16	10.1	9.7	4.2	4.2
	Mean	**16.6**	**13.7**	**2.64**	**2.58**	**67.31**	**74.89**	**11.18**	**9.57**	**10.0**	**10.0**	**4.4**	**4.4**
60KN/Fed	Control	15.8	13.9	2.64	2.55	63.74	73.19	10.51	9.28	10.7	10.7	4.3	4.3
	10ppm	16.8	14.4	2.76	2.65	65.71	72.46	11.22	10.01	9.5	9.5	4.6	4.6
	20ppm	18.2	15.7	2.81	2.65	69.93	76.03	12.00	11.32	11.0	11.0	4.7	4.7
	30ppm	17.2	15.8	2.80	2.43	69.85	75.39	11.61	10.51	10.9	10.9	4.4	4.4
	Mean	**17.0**	**15.0**	**2.75**	**2.57**	**67.30**	**74.27**	**11.34**	**10.28**	**10.5**	**10.5**	**4.5**	**4.5**
75KN/Fed	Control	17.0	14.5	2.72	2.68	64.57	68.21	10.81	9.33	9.5	9.5	4.3	4.3
	10ppm	18.2	15.9	2.85	2.72	66.88	71.11	10.90	10.44	9.4	9.4	4.5	4.5
	20ppm	18.9	16.4	2.92	2.78	68.57	76.42	12.52	11.56	9.7	9.7	4.6	4.6
	30ppm	18.5	15.8	2.88	2.67	65.75	68.37	12.00	11.17	9.4	9.4	4.5	4.5
	Mean	**18.2**	**15.7**	**2.84**	**2.71**	**66.44**	**71.03**	**11.81**	**10.63**	**9.5**	**9.5**	**4.5**	**4.5**
Mean of IBA	Control	16.2	13.3	2.65	2.57	64.02	70.67	10.44	8.89	9.8	10.1	4.4	4.4
	10ppm	17.1	14.3	2.76	2.66	66.10	73.75	11.37	9.89	9.5	9.4	4.5	4.5
	20ppm	18.2	15.9	2.80	2.68	69.47	77.17	12.14	11.25	10.6	10.6	4.6	4.6
	30ppm	17.3	15.6	2.77	2.57	68.48	73.38	11.80	10.61	10.1	10.0	4.4	4.4
						LSD 0.05							
A		0.68	0.22	0.03	0.04	0.56	0.93	0.38	1.11	ns	ns	ns	ns
B		0.53	0.15	0.02	0.03	ns	0.58	0.45	0.28	ns	ns	ns	ns
A×B		1.58	0.44	0.05	0.10	2.55	1.75	0.78	0.48	ns	ns	ns	ns

Table 3. Effect of interaction between nitrogen (A) and indol-3-butric acid (IBA) (B) chemical contents of cotton plant (Giza 80) in 2011 and 2012 seasons.

A	B	In leaves after 15 days from the last spraying treatments in mature seeds					
		Chlorophyll A (mg/g. dw)	**Chlorophyll B (mg/g. dw)**	**Total chlorophyll (A+B) (mg/g. dw)**	**Carotenoids content (mg/g. dw)**	**Protein %**	**Oil%**
45KN/Fed	**Control**	3.46	2.17	5.63	0.40	20.81	16.52
	10ppm	3.80	2.16	5.16	0.58	21.12	16.93
	20ppm	4.00	2.59	6.59	0.72	22.90	18.00
	30ppm	3.91	2.22	6.13	0.72	22.33	17.44
	Mean	**3.79**	**2.29**	**5.88**	**0.61**	**21.79**	**17.22**
60KN/Fed	**Control**	4.22	2.77	6.99	0.75	23.70	17.71
	10ppm	4.45	2.61	7.06	0.76	24.81	17.73
	20ppm	4.50	3.00	7.50	0.90	25.72	19.27
	30ppm	4.36	2.95	7.31	0.89	25.00	18.42
	Mean	**4.38**	**2.83**	**7.22**	**0.83**	**24.81**	**18.88**
75KN/Fed	**Control**	4.76	3.21	7.97	0.90	25.41	17.40
	10ppm	4.82	3.42	8.24	0.89	27.29	17.56
	20ppm	5.54	3.71	9.25	0.91	29.11	19.44
	30ppm	5.26	3.50	8.76	0.91	28.60	18.15
	Mean	**5.10**	**3.46**	**8.56**	**0.90**	**27.60**	**18.14**
Mean of IBA	**Control**	4.17	2.72	6.86	0.68	23.31	17.21
	10ppm	4.36	2.73	6.82	0.78	24.41	17.41
	20ppm	4.68	3.10	7.78	0.84	25.91	18.91
	30ppm	4.51	2.89	7.40	0.84	25.31	18.00
				LSD 0.05			
A		0.07	0.07	0.14	0.07	0.10	0.32
B		0.45	NS	NS	0.12	2.35	0.71
A×B		0.78	0.87	1.70	0.21	4.07	1.23

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إستجابة نبات القطن للمعامله بمركب أندول حمض البيوتريك تحت مستويات من التسميد النيتروجينى

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الملخص العربى:

أقيمت تجربتان حقليتان بالمزرعة البحثية بمحطة بحوث سدس – محافظة بنى سويف بموسمى 2011 – 2012 على صنف القطن جيزة 80 بهدف دراسة تأثير التسميد النيتروجينى بمعدلات (45 – 60 – 70 كجم نيتروجين للفدان) مع الرش بإربعة تركيزات من مركب أندول حمض البيوتريك (صفر – 10 – 20 – 30 جزء فى المليون) على صفات النمو والمحصول ومكوناته وبعض صفات الألياف والمكونات الكيميائية.

أوضحت النتائج أن أضافة 75 كجم للفدان أدى إلى زيادة معنوية لكل من طول النبات وعدد العقد للنبات ومتوسط طول السلامية والنسبة المئوية لبقاء المواقع الثمرية وعدد الأفرع الثمرية للنبات وعدد اللوز المتفتح للنبات ومتوسط وزن اللوزة والنسبة المئوية للتبكير ومحصول الفدان بالقنطار والمكونات الكيميائية (الأوراق – البذور). بينما لم تتأثر معنوياً كل من إرتفاع عقدة أول فرع ثمرى لموسم واحد فقط والمتانة والنعومه لكلا الموسمين.

كما أظهرت النتائج أن الرش بأندول حمض البيوتريك بتركيز 20 جزء المليون أدى لزيادة معنوية لكل من طول النبات وعدد العقد ومتوسط طول السلامية والنسبة المئوية لبقاء المواقع الثمرية وعدد اللوز المتفتح للنبات ومتوسط وزن اللوزة ومحصول الفدان بالقنطار وعدد الأفرع الثمرية والنسبة المئوية للتبكير بموسم واحد فقط وكلوروفيل أ والكاروتينات والنسبة المئوية للبروتين والزيت. بينما لم يتأثر كل من إرتفاع أول عقدة فرع ثمرى والمتانة والنعومة وكلورفيل ب وإجمالى الكلوروفيل (أ+ب) لكلا الموسمين.

وعموماً أكدت النتائج أن التفاعل بين مستويات النيتروجين والرش بمركب أندول حمض البيوتريك أدى لزيادة معنوية لكل من صفات النمو والمحصول ومكوناته والصفات الكيميائية لكلا الموسمين فيما عدا صفات إرتفاع عقدة أول فرع ثمرى والمتانة والنعومة لكلا الموسمين وذلك لأفضلية إستخدام التسميد النيتروجينى 75 كجم نيتروجين للفدان والرش بـ 20 جزء فى المليون من إندول حمض البيوتريك.