ADVNACE RESEARCH JOURNAL OF CROP IMPROVEMENT
Volume 2 Issue 1 (June, 2011) Page : 39-41

Received : February, 2011; ***Accepted :*** March, 2011

Research Paper

Effect of plant growth regulator on yield and quality of irrigated cotton

S.S. PAGAR, B.S. GUNJAL AND S.S. CHITODKAR

See end of the article for authors' affiliations

Correspondence to :

B.S. GUNJAL
Department of Agronomy, College of Agriculture, DHULE (M.S.) INDIA

ABSTRACT

A field experiment was conducted during the *Kharif* season of 2003 to study the Effect of Plant Growth Regulator on Yield and Quality of Irrigated Cotton cv.NHH-44 under irrigated condition on medium black soil of M.P.K.V. Rahuri (Maharashtra).The sprays were applied at tiny square formation stage, first on bloom stage and followed by boll setting stage. Atonik seed treatment, Atonik foliar sprays @ 0.1%, 0.25% and 0.5% and NAA @ 20 ppm and 40 ppm significantly increased seed cotton yield over control. Yield increase due to foliar spray of NAA was(20 ppm) was 21.55% higher over control and 4.98% over FS of Atonik (0.25%) and NAA (20 ppm) significantly increased the staple length 0.82%, fineness 4.57% over the control. Atonik and NAA treatments also significantly increased the lint index, bundle strength and ginning (%) as compared to control, while seed- index was highest with control (6.88g.)

Pagar, S.S., Gunjal, B.S. and Chitodkar, S.S. (2011). Effect of plant growth regulator on yield and quality of irrigated cotton, *Adv. Res. J. Crop Improv.,* **2** (1) : 39-41.

Key words : Cotton, Atonik, NAA, Foliar spray

INTRODUCTION

Cotton is one of the most ancient and important commercial crop next to food grain. India ranks third in production of cotton lint but the productivity of lint cotton is the only 294 kg ha^{-1} (Anonymous, 2000).Among the various constraints of low productivity erratic behavior of rainfall, lack of improved technology, lack of organic manuring , unavailability of timely irrigation, lack of use of plant protection measures etc . The demand for clothing is also increasing and to fulfill this demand special attention needs to be given to increase the productivity of cotton crop which could be achieved only by using best quality seed, timely and sufficient quantity of irrigation Water, balance nutrient management, weed control followed by plant protection measures. Besides these techniques, use of plant growth regulators also needs to be adopted.

Plant growth regulators are organic compounds other than nutrients, which increases yield and improves quality through stimulation of plant metabolism resulting in better mineral uptake, assimilates flow and quicker synthesis of enzymes, membrane stress protectors, and other indispensable substances. It induces better root system and an improvement of cell membrane integrity and nutritional status renders plants less susceptible to the environmental pressure, reducing application of pesticide (Akram *et al.,* 2003).The application of plant growth regulators in cotton are in vogue. But the plant growth regulators *viz.,* Atonik and NAA were not tested in cotton crop to assign their effect on yield. Hence, these regulators were tested in cotton crop.

MATERIALS AND METHODS

An investigation was carried out during *Kharif* season of 2003 at Cropping Systems Research Project, Mahatma Phule krishi Vidyapeeth, Rahuri on medium black soil .The soil was slightly alkaline in reaction, low in available nitrogen (140.15kg ha^{-1}),medium in phosphorus (15.10 kg ha^{-1})and high in available potash (415.90 kg ha^{-1})

Eight treatment comparring of plant growth regulators, water spray along with control *i.e.* T_1- Seed treatment of Atonik 0.3% @ 3 ppm, T_2- Foliar Spray of Atonik 0.3 % @ 0.1%, T_3 - Foliar Spray of Atonik 0.3 %

@ 0.25 %, T_4 - Foliar Spray of Atonik 0.3 % @ 0.5%, T_5 - Foliar Spray of NAA @ 20 ppm, T_6 - Foliar Spray of NAA @ 40 ppm, T_7 - Foliar Spray of water, T_8 - Untreated control were tested in randomized block design by replicating thrice. The gross and net plot size were 8m x 6m and 6m x 4m, respectively. The crop was sown on 21st June 2003 by dibbling at spacing of 1mx1m. The spraying was done at tiny square formation stage (35DAS), first bloom stage (50 DAS), boll setting stage (85 DAS) by using hand compressor sprayer. The two control water spray and untreated control were used.

RESULTS AND DISCUSSION

The data recorded during the course of investigation were tabulated, statistically analysed and results are intepreted here under appropriate heads:

Yield contributing characters:

Boll characters:

Significant by the highest boll weight 3.99 g, seed cotton weight 3.54 g / boll ,seed weight 2.26 g / boll, lint weight 1.28 g / boll was recorded in the treatment T_5 – Foliar spray of NAA @ 20 ppm being at par with T_6 -FS of NAA @ 40 ppm and T_3 - FS of Atonik 0.3 % @ 0.25 %.Similar results are also reported by Prasad and Prasad (1994) from their investigation.

Yield:

Seed cotton yield:

All the treatments proved their significant superiority over control. Treatment T_5 -FS of NAA @ 20 ppm recorded significantly higher seed cotton yield (19.80 q ha $^{-1}$) followed by the treatment T_6 -FS of NAA @ 40 ppm (19.26 q ha $^{-1}$) and T_3 -FS of Atonik 0.3 % @ 0.25 %. (18.86 q ha $^{-1}$). The results are in close conformity with the results of Guo and Oosterhuis 1995 as they reported that the growth regulator Atonik has been found beneficial in improving yield. Patel (1992) and Pol and Thombre (1985) also confirmed the effect of application foliar spray of NAA in increasing yield of seed cotton.

Cotton stalk yield:

All the treatment tested during the investigation found significantly superior over control.Treatment T_5 -FS of NAA @ 20 ppm recorded significantly higher cotton stalk yield (35.99 q ha^{-1}) being at par with the treatment T_6 -FS of NAA @ 40 ppm (35.28 q ha^{-1}). Similar finding are also reported Choudhari and Batkal (1977) from the results of their investigation.

Quality parameters:

The study on quality parameters indicates that all the treatment were significantly superior over control. The treatment T_5 -FS of NAA @ 20 ppm was found significantly higher in ginning percentage (36.28 %), lint Index (3.92%), staple length (30.74 mm), bundle Strength (47.80 g tex^{-1}), maturity coefficient (0.92 %) and fibre finess (4.35 militex) over all the treatments except the treatment T_1 to T_4 were being at par with lint index(T_1-3.70,T_2-3.77, T_3-3.79, T_4-3.72 %). The treatment T_1,T_2 and T_4 were being at par among each other for staple length (T_1 -30.60,T_2-30.64, T_4 -30.62 mm).The seed -index was maximum in the control plot (6.88g) where as it was minimum lowest in the treatment T_5 -FS of NAA @ 20 ppm (6.49 g). The increase in quality parameter of cotton with the use of growth regulator Atonik was found beneficial as reported by Djanaguiraman *et al.,* (2004).

Table 1 : Yield contributing char actors and yield cotton (q ha^{-1}) at harvest as affected by different treatment

Sr. No.	Treatments details	Boll weight (g)	Seed cotton weight boll^{-1} (g)	Seed weight boll $^{-1}$ (g)	Lint weight boll $^{-1}$ (g)	Seed cotton yield (q ha $^{-1}$)	Stalk yield (q ha $^{-1}$)
1.	T_1: ST of Atonik 0.3% @ 3 ppm	3.50	3.18	2.04	1.14	17.12	32.36
2.	T_2: FS of Atonik 0.3% @ 0.1%	3.64	3.24	2.07	1.17	17.92	33.62
3.	T_3: FS of Atonik 0.3% @ 0.25%	3.79	3.37	2.15	1.22	18.86	34.44
4.	T_4: FS of Atonik 0.3% @ 0.5%	3.68	3.20	2.05	1.15	17.46	33.13
5.	T_5: FS of NAA @ 20 ppm	3.99	3.54	2.26	1.28	19.80	35.99
6.	T_6: FS of NAA @ 40 ppm	3.86	3.46	2.21	1.25	19.26	35.28
7.	T_7: FS of water	3.52	3.10	1.99	1.11	16.59	31.64
8.	T_8: Untreated control	3.46	3.06	1.96	1.10	16.29	30.79
	S.E.±	0.08	0.09	0.06	0.04	0.04	0.04
	C.D. (P=0.05)	0.24	0.27	0.18	0.12	0.12	0.12
	General mean	3.69	3.27	2. 09	1.18	17.91	33.41

ST: Seed Treatment FS: Foliar Spray

Table 2 : The quality parameters of cotton as affected by different treatments

Sr. No.	Treatments details	Ginning percentage (%)	Seed index (g)	Lint index (%)	Staple length (mm)	Bundle strength (g tex $^{-1}$)	Maturity coefficient (%)	Fibre fineness (militex)
1.	T_1: ST of Atonik 0.3% @ 3 ppm	35.77	6.72	3.70	30.60	46.91	0.62	4.18
2.	T_2: FS of Atonik 0.3% @ 0.1%	35.92	6.65	3.77	30.64	47.06	0.78	4.25
3.	T_3: FS of Atonik 0.3% @ 0.25%	36.07	6.64	3.79	30.67	47.11	0.83	4.28
4.	T_4: FS of Atonik 0.3% @ 0.5%	35.86	6.71	3.72	30.62	46.98	0.71	4.22
5.	T_5: FS of NAA @ 20 ppm	36.28	6.49	3.92	30.74	47.80	0.92	4.35
6.	T_6: FS of NAA @ 40 ppm	36.16	6.57	3.85	30.71	47.12	0.89	4.32
7.	T_7: FS of water	35.69	6.80	3.64	30.53	46.85	0.57	4.17
8.	T_8: Untreated control	35.61	6.88	3.59	30.49	46.52	0.51	4.16
	S.E.$\pm$	0.01	0.01	0.01	0.01	0.02	0.01	0.01
	C.D. (P=0.05)	0.03	0.03	0.03	0.03	0.05	0.03	0.03
	General Mean	35.93	6.68	3.75	30.63	47.04	0.73	4.24

ST: Seed Treatment FS: Foliar Spray

From the results of the present experimentation, it can be concluded that for maximization of higher seed cotton yield, better quality of cotton fibre, foliar Spray of NAA as growth regulator @ 20 ppm at tiny square formation stage (first bloom stage and boll setting stage) should be adopted under irrigated cotton crop in deep black soils of scarcity zone of western Maharashtra.

Authors' affiliations:
S.S. PAGAR AND S.S. CHITODKAR, Department of Agronomy, College of Agriculture, DHULE (M.S.) INDIA

LITERATURE CITED

Akaram,A., Jilani, G. and Akram,M. (2003). Responce of cotton to Synergistic Use of Fetilizers and Growth Regulators. *Asian J. Plant Sci.,* **2**(13):974-977.

Anonymous (2000). Package of practices for eco-friendly organic cotton. A Report on Research Work done in irrigated and rain fed cotton and jute and allied fiber crop. AICCP, M.P.K.V., Rahuri. pp. 7-8.

Choudhari, C.S. and Bathkal, B.G. (1977). Responce of cotton to combined spray of hormones and NPK. *Indian J. Agri. Res.*, **11**:19-24.

Djanaguiraman, M., Manivannam,V., Kathirvelam,P., Annie Sheeba, J., Durga Devi, D. and Bangaruswamy, U. (2004). Effect of Atonik on quality parameters of cotton. *Asian J. Plant Sci.*, **3**(5): 628-631.

Guo, C. and Oosterhuis, D.M. (1995). Atonik: a new plant growth regulator to enhance yield of cotton. Proceeding Belt wide cotton Conference. San Antonia, Texas. USA, **2:** Memphis USA; *National Cotton Council*: 1086-1088.

Patel, J.K. (1992). Effect of Triacontanol and Naphthalene Acetic Acid on lint yield, fibre quality and nitrogen, phosphorus and potash uptake in cotton (*Gossypium species*). *Indian J. Agron.*, **37** (2):332-337.

Pol, K.M.and Thombre,M.V. (1985). Efficacy of Pix (*1.1.dimethyl piper-dinium chloride*) growth regulators boosting cotton yield. C*urr. Res. Rept.,* **1**: 171-172.

Prasad, M.and Prasad, R. (1994). Effect of some plant growth regulators in Cotton. *Indian J. Plant Physiol.,* **37** (2):109-110.

****
******