SHORT COMMUNICATION

EFFECT OF GA_3 AND NAA ON GROWTH AND FLOWERING OF OKRA (*ABELMOSCHUS ESCULENTUS* L.) CV. GUJARAT OKRA- 2

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Abstract: A field experiment was conducted at Horticulture Instructional Farm, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar during the *Kharif* season 2012, respectively to study the effect of GA_3 and NAA on growth and flowering of Okra. Growth parameters like plant height and stem thickness (90 DAS), average length of interned and leaf area per plant (60 DAS) and number of nodes per plant and flowering parameters like days taken for initiation of first flower, days taken for flower initiation to edible maturity, days taken for sowing to first picking and days taken for sowing to last picking were analyzed. The experiment consisted of 16 treatments combination involving two growth regulators with four levels each (0, 25, 50 and 75 ppm). GA_3 and NAA (75 ppm) was found to be the most effective in increasing more stem thickness (1.95 cm), average length of interned (4.98 cm), Minimum days taken for flower initiation to edible maturity (5.88) and days taken for sowing to first picking (115.38). Treatment combination of (g_3n_2) increasing plant height (85.96 cm) and leaf area per plant (2427.86). Were as maximum number of nodes per plant (18.34) found combination with (g_3n_3) and minimum days taken for initiation of first flower (42.09) and days taken for sowing to first picking (49.10) was found treatment combination of (g_0n_1) respectively.

Keywords: Okra, GA_3, NAA, Growth, Flowering

INTRODUCTION

Okra (*Abelmoschus esculentus* L.) is an annual vegetable crop and belongs to family Malvaceae and is native of subtropical Africa. It is annual vegetable crop grown from seed in tropical and sub-tropical parts of the world. Now it is grown throughout the year for its tender green fruits. India is the largest producer of okra. Besides being a vegetable, it also has medicinal and industrial important. Role of plant growth regulators in crop production is well known phenomenon. Its use in promotes growth along the longitudinal area, increase number of branches, early flower initiation, fruit set and subsequently contributes towards higher production when applied at various concentration. Due to this it is possible to achieve the desirable standards and norms in term of quality for exportable production. Therefore, present investigation was carried out to find out suitable plant growth regulator, concentration and its effect on growth and flowering parameters of okra.

MATERIAL AND METHOD

An experiment entitled effect of GA_3 and NAA on growth and flowering of okra was carried out during the year 2012 at the Horticulture Instructional Farm, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar. The design followed was Factorial Randomized Block Design with three replications. The treatments consist of different concentration of plant growth regulators viz. GA3 and NAA (0, 25, 50 and 75 ppm each) were applied as foliar spray at 25 days after sowing. Distilled water was sprayed as control. The recommended dose of fertilizers @ 50:50:50 kg NPK/ha were applied at the time of sowing and remaining half dose of N (50 kg) was applied in the form of urea (top dressing) one month after sowing and other standard culture practices recommended for okra were uniformly followed for all the treatments. The seeds were dibbled at the spacing of 45 x 30 cm. The observations regarding growth viz. plant height, stem thickness, average length of interned, number of nodes per plant and leaf area per plant and flowering viz. days taken for initiation of first flower, days taken for flower initiation to edible maturity, days taken for sowing to first picking and days taken for sowing to last picking of okra were taken and the data subjected to statistical analysis.

Table 1. Treatment combinations.

Treatments. No.		Details of treatment
g_0n_0	:	GA_3@ 0 ppm + NAA @ 0 ppm (Control)
g_0n_1	:	GA_3@ 0 ppm + NAA @ 25 ppm
g_0n_2	:	GA_3@ 0 ppm + NAA @ 50 ppm
g_0n_3	:	GA_3@ 0 ppm + NAA @ 75 ppm

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g_1n_0	:	GA_3@25 ppm + NAA @ 0 ppm
g_1n_1	:	GA_3@25 ppm + NAA @ 25 ppm
g_1n_2	:	GA_3@25 ppm + NAA @ 50 ppm
g_1n_3	:	GA_3@25 ppm + NAA @ 75 ppm
g_2n_0	:	GA_3@50 ppm + NAA @ 0 ppm
g_2n_1	:	GA_3@50 ppm + NAA @ 25 ppm
g_2n_2	:	GA_3@50 ppm + NAA @ 50 ppm
g_2n_3	:	GA_3@50 ppm + NAA @ 75 ppm
g_3n_0	:	GA_3@75 ppm + NAA @ 0 ppm
g_3n_1	:	GA_3@75 ppm + NAA @ 25 ppm
g_3n_2	:	GA_3@75 ppm + NAA @ 50 ppm
g_3n_3	:	GA_3@75 ppm + NAA @ 75 ppm

GA_3-Gibberellic Acid, NAA-Naphthalene Acid, PPM-Part Per Million, @-At the Rate

Table 2. Effect of GA_3 and NAA on growth and flowering of okra cv. Gujarat Okra-2.

Treatment		Plant height at 90 DAS (cm)	Stem thickness at 90 DAS (cm)	Average length of interned at 60 DAS	Number of nodes per plant	Leaf area per plant at 60 DAS	Days taken for initiation of first flower	Days taken for flower initiation to edible maturity	Days taken for sowing to first picking	Days taken for sowing to last picking
T_1	g_0n_0	72.88	1.77	4.17	15.50	1603.69	47.08	7.15	54.21	108.63
T_2	g_0n_1	79.09	1.88	4.31	16.21	1712.36	42.09	7.08	49.10	113.58
T_3	g_0n_2	78.80	1.86	4.73	18.04	1985.68	43.71	6.88	50.53	112.96
T_4	g_0n_3	82.75	1.92	4.60	16.15	1736.89	45.96	7.06	52.96	111.83
T_5	g_1n_0	78.92	1.86	4.22	16.21	2010.45	44.50	7.02	51.48	115.13
T_6	g_1n_1	78.46	1.85	4.52	17.71	2114.61	47.25	6.92	54.10	114.08
T_7	g_1n_2	82.84	1.92	4.49	17.79	1770.60	44.92	7.08	51.94	113.04
T_8	g_1n_3	78.38	1.86	4.62	17.61	2103.64	42.84	7.05	49.89	112.42
T_9	g_2n_0	80.25	1.90	4.55	16.59	2351.60	45.59	6.98	52.52	113.83
T_{10}	g_2n_1	75.50	1.94	4.46	17.09	2101.09	46.00	7.06	52.96	111.08
T_{11}	g_2n_2	79.21	1.94	4.65	16.71	2164.20	44.34	6.83	51.14	113.50
T_{12}	g_2n_3	85.71	1.76	4.25	18.34	2415.74	43.63	6.92	50.52	114.25
T_{13}	g_3n_0	79.04	1.89	4.74	17.54	2262.29	46.29	6.96	53.19	114.67
T_{14}	g_3n_1	84.96	1.90	4.45	17.92	2399.13	45.96	7.00	52.90	114.67
T_{15}	g_3n_2	85.96	1.89	4.53	16.22	2427.86	46.05	6.94	52.97	111.83
T_{16}	g_3n_3	83.38	1.95	4.98	17.76	2417.13	44.79	5.88	50.64	115.38
S.Em ±		1.65	0.02	0.11	0.43	73.25	0.76	0.15	0.76	1.12
C.D.@ 5%		4.76	0.06	0.34	1.24	210.86	2.21	0.44	2.20	3.24

RESULT AND DISCUSSION

Data revealed that interaction effect of GA_3 and NAA significantly influenced the growth and flowering of okra. Application of GA_3 75 ppm + NAA 50 ppm recorded significantly maximum plant height (85.96 cm) and leaf area per plant (2427.86 cm2) whereas, minimum plant height (72.88 cm) and leaf area per plant (1603.69 cm2) was recorded in control treatment.

Combined application of GA_3 and NAA also significantly influenced the growth and flowering of okra. Maximum stem thickness (1.95 cm), average length of internodes (4.98 cm), days taken for sowing to last picking (115.38) and minimum days taken for flower initiation to edible maturity (5.88) was recorded with treatment GA_3 75 ppm + NAA 75 ppm whereas, minimum stem thickness (1.77 cm), average length of internodes (4.17 cm), days taken for sowing to last picking (108.63) and maximum days taken for flower initiation to edible maturity (7.15) was recorded with control treatment.

The significantly minimum days taken for initiation of first flower (42.09) and days taken for sowing to first picking (49.10) was observed with treatment GA_3 0 ppm + NAA 25 ppm while, maximum number of nodes per plant (18.34) was recorded with treatment GA_3 50 ppm + NAA 75 ppm whereas, minimum number of nodes per plant (15.50) and maximum days taken for sowing to first picking (54.21) was recorded with control treatment while, maximum days taken for initiation of first flower (47.25) was observed with treatment GA_3 25 ppm + NAA 25 ppm.

The improvement in growth as a result of GA_3 and NAA might be attributed to their function in stimulation of metabolic activities and hormonal regulation. GA_3 and NAA that stimulates the growth of plant tissues there by enhancement in cell multiplication and cell elongation resulting in increased growth and flowering. Present results are

in close agreement with those of Arora *et al*. (1990), Syed *et al*. (1997), Hussaini and Babu (2004), Laxman *et al*. (2005), Tyagi *et al*. (2008), Patil and Patel (2010), Dhage *et al*. (2011) and Jaymala *et al*. (2012).

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