

Effect of Growth Regulants and Nitrogen on Growth, Yield and Quality of Ribbed Gourd (*Lufa acutuangula* Poem) Var. Satapatria.

By

R. C. DAS

ABSTRACT

The effect of growth regulants on growth, yield and quality of ribbed gourd fruit was significant. Ethrel at 200 ppm, Alar 85 at 200 ppm and Planofix at 100 to 200 ppm significantly stimulated the vegetative growth of the plants. The effect of nitrogen at 40 kg/ha on growth of plant was significant. The effect of growth regulants and nitrogen on fruit weight, total yield and total solid and ascorbic acid of fruits were significant.

INTRODUCTION

Ribbed gourd is a heavy creeper producing abundant flowers but the yields are low compared to its vegetative growth. A trial was therefore undertaken to study the effect of nitrogen and growth regulants on growth, yield and quality of ribbed gourd.

MATERIALS AND METHODS

An experiment was conducted during 1973 (March–June) at the Horticultural Research Station, Orissa University of Agriculture and Technology, Bhubaneswar. The soil in the field was sandy loam with 876.3 kg/ha total nitrogen, 314 kg/ha of available P_2O_5 and 72.5 kg/ha of available potash. The organic matter content of the soil was 0.48 per cent with a pH of 6.7. A local variety ribbed gourd was chosen for the study. A split plot design was adopted with seven growth chemical regulants in the main plot and nitrogen 0, 20 and 40 kg/ha in the sub-plots

which were replicated three times. The regulants were sprayed twice, first at 3-4 true leaf stage and the second 5-6 true leaf stage, i. e. 14 and 21 days after sowing. The height, girth of stem, leaf number and leaf area of the plants at the 80th day after planting were recorded. The total solids content (TSS) of the fruit was directly read with the help of a brix hydrometer, while the ascorbic acid content was estimated by the iodine titration method.

RESULTS AND DISCUSSION

The effect of planofix, Alar 85, Ethrel and nitrogen on the growth of ribbed gourd revealed that there was no significant effect on plant height but the girth of the stem was significantly increased by the treatments (Tables 1 and 3). Ethrel at 200 ppm caused the maximum stem thickness followed by Planofix at 200 ppm and Alar at 200 ppm. Nitrogen at 40 kg/ha also significantly increased the stem thickness as compared to the control.

Department of Horticulture, Orissa University of Agriculture and Technology, Bhubaneswar.

TABLE 1. Leaf number per plant and diameter of stem as influenced by various treatments

Growth regulants	Nitrogen (kg/ha)			Mean
	0	20	40	
Planofix 100 ppm	78.83 (0.87)	85.83 (0.77)	62.00 (0.76)	75.55 (0.80)
„ 200 ppm	90.16 (0.90)	84.00 (0.83)	84.00 (0.99)	86.05 (0.90)
Ethrel 100 ppm	100.33 (0.84)	97.00 (0.89)	76.50 (0.84)	85.27 (0.85)
„ 200 ppm	73.83 (0.94)	90.66 (0.82)	111.83 (0.96)	91.94 (0.91)
Alar 85. 100 ppm	78.83 (0.89)	79.00 (0.83)	85.83 (0.83)	81.05 (0.85)
„ 200 ppm	66.33 (0.93)	94.33 (0.81)	101.00 (0.82)	88.33 (0.86)
Control	52.66 (0.92)	83.33 (0.72)	73.50 (0.71)	69.83 (0.78)
C. D. (0.05) for N with same level of G. S.	16.00	—	—	—
C. D. (0.05) for G. S. at same level of N	49.91	—	—	—
C. D. (0.05) for N with same level of G. S.	(0.04)	—	—	—
C. D. (0.05) for G. S. with same level of N.	(0.16)	—	—	—

(Figure in parenthesis represent diameter of stem in cm.)

The interaction of nitrogen with the growth regulants was also significant. Bose and Ghosh (1968) working with B-Nine reported similar results in cucurbits.

The effects of these chemicals and nitrogen on the length and number of internodes indicated that treatment with 40 kg/ha of nitrogen with Alar at 200 ppm, Ethrel at 200 ppm or Planofix at 200 ppm significantly reduced the length (Table 2). Mc Murry and Miller

(1969) reported shorter internodes with Ethrel, while, Griggs and Iwakiri (1967) reported shorter internodes with Alar 85. The interactions between growth regulants and nitrogen significantly reduced the internodal length as compared to the control. There was an increase in leaf number per plant, the highest being with Ethrel at 200 ppm which is closely followed by Alar-85 at 200 ppm and Planofix at 200 ppm. However, there were not significant differences among the treatments with

TABLE 2. Mean number and length of internodes as affected by growth regulants and nitrogen

Mean	Growth regulants	Nitrogen (kg/ha)			Mean
		0	20	40	
75.55 (0.80)	1. Planofix 100 ppm	20.83 (18.66)	24.66 (18.08)	25.50 (17.66)	23.77 (18.13)
36.05 (0.90)	2. Planofix 200 ppm	21.00 (18.50)	22.50 (16.25)	21.66 (14.16)	21.27 (16.30)
35.27 (0.85)	3. Ethrel 100 ppm	21.16 (17.55)	22.66 (17.16)	23.50 (16.25)	22.44 (17.00)
31.94 (0.91)	4. Ethrel 200 ppm	18.56 (17.66)	21.00 (15.83)	24.83 (15.50)	21.30 (16.08)
31.05 (0.85)	5. Alar 85 100 ppm	20.50 (16.91)	27.66 (19.00)	20.66 (17.25)	22.73 (17.38)
38.33 (0.86)	6. Alar 85 200 ppm	20.83 (19.00)	22.33 (18.50)	21.00 (10.91)	21.38 (16.13)
39.83 (0.78)	7. Control	21.16 (18.83)	24.66 (18.25)	25.50 (17.91)	24.11 (18.33)
—	C. D. 0.05% N with same level of G. S.	6.97 (2.54)	C. D. 0.05% G. S. with same level of N 2.61 (4.09)		

(The figure in parenthesis represent length of internode in cm.)

growth regulants as compared to the control but application of nitrogen at 40 kg/ha significantly increased the leaf number per plant. The data on leaf area (Table 3) was considerably reduced due to treatments with the exception of Planofix. Application of nitrogen at 40 kg/ha in combination with regulants increased the leaf number and leaf area resulting in higher fruit yield (Table 3). In particular Ethrel at 200 ppm promoted the maximum number of fruits per plant which was

significantly superior to control and other treatments. Coyn (1970) working with squash crop and Splittoeser (1971) with pumpkin crop reported higher fruit number with Ethrel.

The individual fruit weight further confirms the significant effect of the various treatments (Table 3). Ethrel at 200 ppm and Planofix at 100 ppm significantly produced the maximum weight of the individual fruit followed by Alar at 200 ppm compared with

TABLE 3. Effect of nitrogen and growth regulants on growth, yield and quality of ribbed gourd

Treatment	Height 80th day (cm)	Leaf area (sq. cm.)	No. of fruits per plant	Wt. of single fruit (g)	Wt. of fruits per plant (kg)	T S %	Ascorbic acid in 100 cc of Juice (mg)
Planofix 100 ppm	335.0	238.54	9.71	178.0	1.728	1.0	1.01
" 200 ppm	296.1	231.73	11.75	155.6	1.828	1.1	1.12
Ethrel 100 ppm	315.7	207.84	12.77	154.3	1.970	1.1	1.03
" 200 ppm	286.8	204.85	17.99	178.0	2.619	1.2	1.23
Alar (85) 100 ppm	308.5	209.57	10.94	145.6	1.592	1.2	0.92
" 200 ppm	291.1	208.90	14.93	165.3	2.469	1.3	1.01
Control	344.9	239.67	9.31	134.6	1.253	1.0	0.71
Nitrogen 0 kg/ha	300.1	204.48	11.75	141.14	1.658	1.1	0.91
" 20 kg/ha	306.2	204.48	11.69	151.57	1.771	1.1	1.16
" 40 kg/ha	316.5	235.34	12.71	166.22	2.112	1.2	1.03
C. D. (0.05%) G. R.	62.97	10.71	1.44	5.60	1.315	—	—
C. D. (0.05%) N levels	36.99	13.60	1.07	18.00	N. S.	—	—

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control. The application of nitrogen significantly increased the fruit weight, which is directly proportional to the rate of application of nitrogen.

The data on the quality of fruits as affected by the various treatments show visible differences as compared to the control (Table 1) Alar at 200 ppm and 100 ppm increased the total solid content (TSS) followed by Ethrel at 200 ppm as compared with the control. The addition of nitrogen steadily increased the (TSS) content.

The effect of various treatments on the ascorbic acid content of the fruit has (Table 3) indicated that Ethrel at 200 ppm increased the quantity to the extent of 2.23 mg/100 ml of juice followed by Planofix at 200 ppm (1.12 mg) as against 0.71 mg/100 ml in the case of control. It is further observed that application of 20 Kg N/ha increased the ascorbic acid content of the fruit to 1.16 mg/100 ml but higher addition of N @ 40 kg / ha reduced the level to 1.03 mg/100 ml juice.

Thus it is evident that application of growth regulants and nitrogen to the ribbed gourd crop not only influenced the growth of the plant but also increased the yield and quality of fruits.

Ethrel, Alar, or Planofix each at 200 ppm with 40 kg/ha of nitrogen could be employed as a cultural practice for promoting the yield.

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