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Effect of NAA and N Levels on Yield and Quality of MCU 9 Cotton*

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An experiment was conducted at the Tamil Nadu Agricultural University, Coimbatore, in the winter season of 1978 on MCU 9 cotton to study the effect of NAA and N on cotton. The treatments included six NAA treatments in the main plots and four N levels in the sub plots. The results of the experiment revealed that NAA and N levels significantly influenced the yield attributes and yield and not the quality characters. Higher seed cotton yield was achieved with 60 kg N/ha and application of 30 + 30 ppm NAA (1716 kg/ha) or with 30 + 20 ppm NAA (1713 kg/ha) applied at flower initiation and 15 days later.

Cotton is an important commercial crop. The phenomenon of excessive shedding of buds, flowers and bolls resulting in low yield of seed cotton is quite common. To step up the yield by reducing shedding of floral forms, plant hormones such as alpha-napthalene acetic acid (NAA) can be used. N also at higher doses has been found to increase the number of flowers per plant and decrease the shedding percentage in cotton. Precise information on the best combination of the hormone and its time of application when used in conjunction with N is lacking. Therefore, an experiment was conducted to find out the optimum concentration of NAA and its time of application and to fix up the optimum dose of N for realising maximum yield of cotton.

MATERIAL AND METHODS

The experiment was conducted at the Millet Breeding Station, Tamil Nadu Agricultural University, Coimbatore. Coimbatore is situated at 11° N and 77° E at an elevation of 426.7 m above mean sea level. During the crop period a total rainfall of 432.8 mm, distributed in 28 rainy days was received. The mean maximum and minimum temperatures was 30.5° and 20.2°C respectivly. The soil was of clay loam type with low, medium and high available N, P_5O_2 and K_2O respectively. The lay out of the experiment was split plot, replicated thrice. The treatments were:

(A) **Main plot treatments** (NAA spray)

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T_1 — No spray
T_2 — Water spray twice, one at flower initiation and another 15 days later
T_3 — 10 ppm NAA as planofix twice as in T_2
T_4 — 20 ppm NAA as planofix twice as in T_2
T_5 — 30 ppm NAA as planofix twice as in T_2
T_6 — 30 ppm NAA as planofix at flower initiation and 20 ppm NAA 15 days later.

(B) **Sub plot treatments** (N levels)

N_0 ... No nitrogen
N_{30} ... 30 kg N/ha
N_{60} ... 60 kg N/ha
N_{90} ... 90 kg N/ha

The crop was sown adopting a spacing of 75 × 30 cm and applied with half of the N as per the treatments along with 30 kg P_2O_5 and 30 kg K_2O/ha uniformly as basal. The remaining half of the N was applied on 45th days and earthed up. NAA sprays were given on 60th and 75th day after sowing. Observations on yield attributes were recorded on 120th day. Seed cotton was harvested in three pickings and the fibre characters were also recorded and analysed.

RESULTS AND DISCUSSION

Yield attributes :

The effects of treatments on the yield attributes are presented in Table I. Neither NAA spray nor the N levels exerted significant effect on monopodial branches as has been observed by Chamy *et al.* (1977). This might be due to the fact that the number of monopodia is more, a varietal character and this could be altered very little by agronomic practices. Sympodial numbers have significantly affected by N levels and not by NAA. This was in conformity with the findings of Dastur and Dabir (1962). Increase in sympodia might be due to incrase in plant height which was observed with N application. The present investigation showed a significant increase in number of fruiting points for the application of NAA and N as pointed out by Milkani and Asana (1958), Annappan and Aaron (1969) and Damodaran (1975). N increased the number of bolls but the percentage increase was less, compared to NAA application. This might be due to the effect of NAA in preventing the formation of abscission layer, leading to low shedding of bolls as observed by Chokhey Singh *et al.* (1969). N_{60} recorded the highest number of bolls which was on par with N_{90}. Boll setting percentage and boll weight were significantly increased by higher levels of NAA and N.

Seed cotton yield :

Spraying of NAA greatly influenced the seed cotton yield (Table I). The treatment T_5 recorded the maximum yield of 1716 kg/ha of seed cotton followed by 1713 kg/ha of seed cotton by T_6 and were found to be superior to other treatments. The in-

TABLE I Effect of NAA and N on yield attributes of cotton MCU 9

Treatments	No. of mono-podia	No. of sympo-dia	Fruiting points per plant	Bolls per plant	Boll setting percentage	Boll weight (g)	Seed cotton yield (kg/ha)
NAA SPRAY							
T_1 Control	1.90	11.9	48.8	13.1	29.3	4.79	1447
T_2 Water spray control	1.92	11.7	49.1	13.2	29.5	4.76	1449
T_3 10 + 10 ppm NAA	1.95	12.4	50.1	14.2	32.4	4.88	1542
T_4 20 + 20 ppm NAA	1.90	12.2	51.1	15.1	34.6	50.1	1627
T_5 30 + 30 ppm NAA	1.90	12.5	52.5	16.1	36.7	5.10	1716
T_6 30 + 20 ppm NAA	1.89	12.8	52.2	16.1	36.7	5.10	1713
S. E.	0.10	0.3	0.8	0.2	0.6	0.08	23
C.D. (P=0.05)	N.S.	N.S.	2.4	0.6	1.8	0.24	73
NITROGEN							
0	1.81	10.3	42.8	12.6	32.0	4.73	1242
30 kg/ha	1.85	11.6	50.2	14.7	32.2	4.85	1601
60 kg/ha	2.00	13.0	53.3	15.7	34.1	5.01	1772
90 kg/ha	1.99	14.2	56.0	15.3	33.5	5.16	1713
S.E.	0.08	0.1	0.7	0.2	0.2	0.08	34
C.D. (P=0.05)	N.S.	0.3	2.1	0.4	0.7	0.23	97

N.S. = Not significant

TABLE II Effect of NAA and N on quality characters on cotton (MCU 9)

Treatments	Ginning per cent	Lint index	Seed index	Mean fibre length (mm)	Fibre fineness (micronaire 10-6 g/in)	Maturity coefficient	Bundle strength (P.S.I. 'O' gauge lbs/mg)
NAA SPRAY							
T_1 Control	34.78	5.83	11.36	30.3	3.98	0.720	7.57
T_2 Water spray twice	34.60	5.90	11.60	30.1	4.04	0.719	7.68
T_3 10 + 10 ppm NAA	35.25	5.82	11.47	30.6	4.06	0.720	8.10
T_4 20 + 20 ppm NAA	35.51	5.85	11.48	30.9	4.03	0.722	7.97
T_5 30 + 30 ppm NAA	35.84	5.91	11.65	31.2	3.96	0.722	8.21
T_6 30 + 20 ppm NAA	35.87	5.95	11.52	31.1	4.08	0.721	8.24
S.E.	0.12	0.06	0.11	0.1	0.04	0.001	0.33
C.D. (P=0.05)	0.36	N.S.	N.S.	0.2	N.S.	N.S.	N.S.
NITROGEN							
0	35.25	5.83	11.47	29.9	3.99	0.720	7.48
30 kg/ha	35.28	5.86	11.56	30.4	4.08	0.720	8.00
60 kg/ha	35.31	5.86	11.58	31.0	3.99	0.722	8.31
90 kg/ha	35.39	5.94	11.44	31.4	4.03	0.721	8.04
S.E.	0.05	0.04	0.10	0.1	0.03	0.001	0.25
C.D. (P=0.05)	N.S.	N.S.	N.S.	0.2	N.S.	N.S.	N.S.

N.S. = Not Significant

creased yield is due to the increased number of fruting points, boll number, boll shedding per cent and boll weight in NAA applied plots. Similar results were recorded by Dharmalingam and Krishnadoss (1977). Among the N levels, N_{60} recorded the maximum seed cotton yield and was on par with N_{90}. The highest seed cotton yield at N_{60} is mainly, due to higher boll setting per cent and boll number. This is in conformity with the findings of Chokhey Singh *et al.* (1969) and Padaki *et al.* (1977).

Quality characters :

The effects of treatments on the quality characters are presented in Table II. Lint index, seed index, fibre fineness, maturity coefficient and bundle strength were not affected by the application of NAA and N as they are said to be more of varietal character (Chamy *et al.* 1976). In this study the ginning percentage was increased by 0.97 to 1.19 per cent by NAA spray compared to control. Similarly NAA spray also increased the fibre length which was not affected by N. Similar observations were made by Annappan and Aaron (1969).

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