

EFFECT OF ANTI-TRANSPIRANTS ON SOIL MOISTURE AND YIELD OF RAINFED COTTON

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Field trials to evaluate the efficacy of antitranspirants on the yield of cotton as well as on the soil moisture depletion by cotton under rainfed condition were conducted from 1981-82, to 1983-84 at the Cotton and Millets Experiment Station, Kovilpatti. Spraying of anti-transpirants with and without soil moisture conservation practices did not effect the seed cotton yield and there was no change in soil moisture levels.

Antitranspirants receive more attention in recent years as a tool to reduce water loss from soil-plant system. Usage of these chemicals on crops is regarded as an approach to improve the water use efficiency of crops. Beneficial effects of phenyl mercuric acetate and kaolin as anti-transpirants have been reported by several workers (Rajan *et al.*, 1981.) With a view to study the effect of anti-transpirants on seed cotton yield and soil moisture levels field experiments were conducted in deep vertisols at the Cotton and Millets Experiment Station, Kovilpatti during *rabi* 1981-82 to 1983-84 under rainfed conditions.

MATERIALS AND METHODS

The soils were low in available

N, medium in available P and rich in available K. The treatments were (1) Control (2) Water spray (3) Kaolin (10 kg/ha) (4) Gruel Water (1:4) (5) Phenyl mercuric acetate (60 g/ha) and (6) Cow dung slurry (1:10). Each treatment was replicated thrice with and without soil moisture conservation practices i.e. tying the ridges on 30th day after sowing at one metre interval in randomised block design. Anti-transpirants were sprayed twice, on 30th day after sowing and one month after the first spraying. Seeds were sown in paired rows with a spacing of (30+60) x 15cm. The cotton varieties tested were C50 during 1981-82 and 82-83 and KC. 1 during 1983-84.

From the date of spraying of anti-transpirants soil moisture estimation

TABLE 1 Rainfall received in mm and rainy days during crop period.

Season	Rainfall received	No. of rainy days
1981-82	112.7 mm	11
1982-83	169.8 ..	21
1983-84	653.1 ..	39

* Cotton and Millets Experiment Station, Kovilpatti.

TABLE 2 Effect of Anti-transpirants on Seed Cotton Yield, Soil Moisture And Quality Characters (Mean Value)

Treatment	Kapas yield (kg/ha)		Soil Moisture						Quality characters (1983-84)			
	82-83		1981-82		1982-83		1983-84		Halo- leng- th mm	Ginning- percen- tage	Lint Index	Seed Index
	1981-82	83-84	0-15 cm	15-30 cm	0-15 cm	15-30 cm	0-15 cm	15-30 cm				
No tied ridging												
1. Control	387	459	21.3	21.6	16.8	17.0	28.3	28.4	23.4	37.34	51.0	85
2. Water	406	463	21.5	21.9	16.7	17.0	29.5	28.6	22.9	39.34	56	86
3. Kaolin	384	478	21.3	21.7	16.8	17.2	28.5	28.0	23.4	40.35	57	83
4. Gruel water	398	473	21.3	21.7	16.7	16.9	29.5	29.4	22.2	38.33	52	85
5. Phenyl mercuric acetate	387	477	21.5	21.8	16.6	17.2	28.5	29.3	22.7	37.80	57	90
6. Gowdung slurry	404	461	21.3	21.6	16.7	17.0	29.9	29.7	23.5	38.67	54	85
Tied Ridging												
1. Control	400	461	21.9	22.2	16.6	17.0	28.7	28.7	22.7	40.33	57	84
2. Water	412	464	22.1	22.3	16.2	17.2	29.0	29.2	21.6	39.00	54	85
3. Kaolin	383	482	22.0	22.2	16.9	17.2	28.8	29.3	22.4	38.67	51	81
4. Gruel water	396	469	22.0	22.3	16.7	17.1	28.9	28.8	22.6	38.76	55	85
5. Phenyl mercuric acetate	393	468	21.9	22.3	16.0	17.2	28.5	29.3	22.4	38.76	53	84
6. Cowdung Slurry	417	463	21.7	22.1	16.8	17.1	28.7	29.9	22.5	38.34	54	87
	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

was done at ten days intervals and final seed cotton yield was recorded. Since the cotton crop did not respond to the treatments during the first two years in respect of seed cotton yield, quality parameters were evaluated during 1983-84 to assess the treatment effects.

RESULTS AND DISCUSSION

In all the three seasons of study significant differences among the various treatments could not be observed in respect of seed cotton yield and soil moisture levels (Table-2). Tying the ridges also had no marked influence on the parameters studied. Significant differences also could not be observed in the case of quality characters such as halo-length, ginning percentage and lint and seed index. Though anti-transpirants spraying had been reported to be beneficial in several cultivated crops, the effectiveness of anti-transpirants is mainly dependent upon the interaction between the anti-transpirants and environmental factors (Devenport *et al.*, 1979). In the present study also there was no response for anti-transpirants. Any environmental factor that induces stomatal closure would reduce the usefulness of anti-transpirants. Since the anti-transpirants lie on the leaf surface they are exposed to weather conditions and destroyed photochemically by solar radiation (Devenport *et al.*, 1979). During the first two seasons the rainfall was low and consequently the soil moisture was also low. Very low soil mois-

ture condition is the another factor which reduces the effectiveness of anti-transpirants (Davenport *et al.*, 1979). During the third season the rainfall high consequently the soil moisture status were too high to realise the effectiveness of anti-transpirants. Yet another reason attributed to the failure of anti-transpirants is the indeterminate growth (Davenport *et al.*, 1979) habit of the cotton crop. The lack of response in the present investigation could be ascribed to the indeterminate growth habit of cotton. Similar trend of non-resposiveness due to phenyl mercuric acetate on tomato was reported by Naeem and Chohan, (1982). From the results it could be concluded that spraying of anti-transpirants in cotton has no beneficial effect on the yield of seed cotton.

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