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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.

Antitrar spirants receive more attention in recent years as a tool to reduce water lows from soil-plant system. Usage of these chemicals on crops is regarded as an approach to improve the water use efficiency of crops. Benefical effects of phenyl mercuric acetate and kaolin as antitranspirants 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 wirh and without soil moisture conservation practices ie, tieing 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 spcaing 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 spraping of antitranspirants 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 Statino, Kovilpatti.

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

2 82-83 83-84 1981-82 1982-83 1983.84 Halo- cm cm cm cm cm cm th mm cm cm cm cm cm th mm cm cm cm cm th mm cm c	1.4.4	Kapas	yield (kg/ha)	(ha)			Soil Moisture	loistur			Qualit	Quality charactors (1983-84)	ors (198	13-84
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water 384 478 2607 21.3 21.7 16.8 17.2 28 5 28.0 23.4 I mercuric acerate 387 477 2491 21.3 21.7 16.7 16.9 29.5 29.4 22.2 Ing slurry 404 461 2576 21.3 21.6 16.7 17.0 29.9 29.7 23.5 sing 412 464 2478 21.9 22.2 16.6 17.0 29.9 29.7 23.5 Instruction acerate 383 482 2591 22.0 16.2 17.2 29.0 29.2 21.6 Instruction acerate 396 469 2588 22.0 22.2 16.7 17.1 28.9 29.3 22.4 Ing Slurry 417 463 2745 21.7 22.1 16.7 17.1 28.9 29.3 22.4 Ing Slurry 417 463 2745 21.7 22.1 16.8 17.1	. Water	406	463	2562	21.5	21.9	16.7	17.0	29.5	28.6	22.9	39.34	26	36
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Jaing Ja	. Phenyl mercuric acetate	387	477	2491	21.5	21.8	16,6	17.2	28.5	29.3	22.7	37.80	57	90
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393 468 2493 21.9 22.3 16.0 17.2 28.5 29.3 22.4 417 463 2745 21.7 22.1 16.8 17.1 28.7 29.9 22.5 NS NS NS NS NS NS NS NS NS	f. Gruel water	396	469	2588	22.0	- 22.3	16,7	17.1	28.9	28.8	22.6	38.76	22	83
417 463 2745 21.7 22.1 16.8 17.1 28.7 29.9 22.5	5. Phenyl mercuric acetate	393	468	2493	21.9	22.3	16,0	17.2	28.5	29.3	22.4	38,76	53	84
WZ WZ WZ WZ WZ WZ WZ	5, Cowdung Slurry	417	463	2745	21.7	22.1	16.8	17.1	28.7	29.9	22.5	38.34	54	87
	£	SZ	S	SN	NS	SN	NS	SS	SN	SN	S	NS.	NS	SN

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). Tieing 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 benefical 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-transplrants lie on the leaf surface they are exposed to weather conditions and destroyed photochemically by solar rediation (Devenport et al., 1979). During the first two seasons the rainfall was low and consequently the soil moisture was also low. Very low soil moisture condition is the another factor which reduces the effectiveness of anti-transpirants (Davenportet 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-resphosiveness 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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