

EFFECT OF TIED-RIDGES AND ANTI-TRANSPIRANTS ON THE YIELD ON RAINFED COTTON AND MOISTURE CONSERVATION

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Experiments were conducted at Cotton and Millets Experiment Station, Kovilpatti during 1980-81 to 1982-83, to study the effect of moisture conservation on the yield of seed cotton, by cultural (forming tied-ridges on 30th day of sowing) and chemical methods (use of anti transpirants). The results revealed that in the first year of study (1980-81) kaolin spray at 10 kg/ha on 50th and 70th day of sowing had recorded significantly higher kapas yield of 792 kg/ha over control, water spray, gruel water spray, PMA spray and cowdung slurry spray. In the other two years of study (1981-82 and 1982-83) there was no significant difference among the treatments. In all the three years of study, moisture conservation by cultural method (tying the ridges on 30th day of sowing to form micro water shed) did not produce any significant impact on yield.

A significant feature of Indian agriculture is that sixty per cent of our cultivable area is dependent on the monsoon rains. Under rainfed conditions, cotton yields are not only lower but also highly unstable due to vagaries of monsoon. The inadequate and ill - distributed rains often lead to crop failures. In dry farming, moisture is the most limiting factor for crop yields. Soil moisture is lost both by evaporation and transpiration through aerial parts of the plants. So, one of the strategies in conservation of moisture would be to reduce the moisture loss due to evapo - transpiration. Anderson (1972) reported deficit moisture at flowering and pollination stages reduced the cotton yield. Seshachalam *et al.*, (1975) observed that critical stage for moisture stress on cotton is the reproductive stage from 55 to

90 days after sowing, when it is most sensitive to moisture stress. Dason and Pothiraj (1980) reported that at Kovilpatti, moisture conservation by tied-ridging after 30 days of sowing recorded highest kapas yield of 318 kg/ha and 35 percent increase over control. Much work has not been done on conservation of moisture comparing to cultural and chemical (antitranspirants) method on the moisture control of cotton. With a view to compare the cultural and chemical means of moisture conservation experiments were conducted under All India Co-ordinated Cotton Improvement Project, at Kovilpatti.

MATERIALS AND METHODS

Experiments were conducted for three years (1980-81 to 1982-83) on

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Table 1 Influence of anti-transpirants and moisture conservation practice on the kapas yield of rainfed cotton (C. 50)

Antitranspirants	Yield of seed cotton [kg/ha]							
	1980 - 1981	1981 - 1982	1982 - 82					
No. moisture conservation	Mo.	M1.	Mean	Mean				
Mo.	M1.	M0.	M1.	SE:				
				SE:				
				CD:				
				[P=0.05]				
Control	503	540	521	384	459	461	460	
Water spray	556	590	573	387	393	390	463	464
Kaolin spray	788	795	792	404	417	410	478	482
Gruel water spray	708	701	705	398	396	397	473	469
Phenyl mercuric Acetate [PMA] spray	574	683	629	406	412	409	477	468
Cowdung slurry spray	683	696	690	387	400	393	461	463
Mean :	635	666	—	394	400	—	469	468
SE :	17.1	—	—	6.0	—	—	5.0	—
CD :	—	—	—	—	—	—	—	—
[P.0.05]	—	—	—	—	—	—	—	—

Table 2 The effect of anti-transpirants and moisture conservation practice on the moisture status of the soil

Antitranspirants	Moisture status of the soil [per cent]											
	1980 - 1981						1981 - 1982					
	60th day MO.	M1.	90th day MO.	M1.	120th day MO.	M1.	60th day MO.	M1.	90th day MO.	M1.	120th day MO.	M1.
Control	20.2	20.6	15.6	15.2	14.7	14.6	22.0	22.8	16.5	16.9	16.5	16.9
Water spray	20.3	20.7	16.3	15.7	15.2	15.2	21.8	22.4	16.5	17.2	16.4	17.4
Kaolin spray	21.2	21.8	19.8	18.8	18.0	17.6	21.7	22.5	16.4	17.0	16.7	17.2
Grual water spray	21.1	21.9	18.0	18.4	16.8	16.4	22.0	22.6	16.4	17.0	16.3	17.3
Phenyl Mercuric Acetate [PMA] Spray	20.3	21.0	17.4	17.6	15.9	16.0	21.9	22.3	17.0	17.3	16.8	17.4
Cowdung slurry spray	20.3	21.2	18.7	18.9	16.2	16.9	21.7	22.7	16.9	17.4	16.7	17.8
Mean	20.6	21.2	17.6	17.4	16.3	16.1	21.9	22.6	16.6	17.2	16.6	17.3

cotton variety C.50 (*Gossypium hirsutum*) in rainfed black cotton soil in randomised block design with three replications. The treatment combinations comprising of cultural method of moisture conservation (tie-ridging on 30th day of sowing) and chemical methods (spraying anti-transpirants viz., Kaolin (10 kg/ha), gruel water spray (1:4), PMA (60 kg/ha or 360 ppm), Cowdung slurry (1:9) with one control and water spray) were compared with no moisture conservation method (no tie-ridging). The sprays were given twice on 50th and 70th day after sowing. The recommended fertilizers and plant protection schedules were common for all the treatments.

RESULTS AND DISCUSSION

The three years data on seed Cotton yield and two years data on soil moisture status are presented in Tables 1 and 2.

In the first year of study the use of anti-transpirants significantly influenced the seed cotton yield. Two sprays of kaolin at the rate of 10 kg/ha on 50th and 70th day recorded significantly higher kapas yield of 792 kg/ha which was 52 percent over control (521 kg/ha) and it was significantly superior to other anti-transpirants sprayed. Gruel water, cowdung slurry and phenylmercuric acetate had recorded an yield of 705, 690 and 629 kg/ha respectively which were on par and significantly superior to control and water spray (573 kg/ha). The latter two were on par

with each other. In the remaining two years of study, there was no significant difference between the anti-transpirants tried. However, Kaolin recorded numerically higher kapas yield in both the years (1981-82 and 1982-83).

In all the three years of study, the moisture conservation through tied-ridging after 30th day of sowing did not influence the yield significantly compared to control (no moisture conservation). The reason may be the meagre rainfall received viz., 32.4 m.m, 78.9 m.m and 56.1 m.m, respectively, during 1980-81, 1981-82 and 1982-83 after the formation of tied-ridges for moisture conservation and hence the effect of tied-ridging could not be expressed in the cropping seasons under study. The interaction between cultural and chemical method of moisture conservation also did not attain statistical significance.

The moisture status of the soil on 60th, 90th and 120th day of sowing was not much influenced either by cultural method (tying the ridges) or by chemical methods (anti-transpirants) and by their interaction effect. Soil moisture depletion was observed as the crop stages advanced which was confirmed by the reduced moisture status of the soil.

Kaolin spray influenced the cotton yield by 14 percent over control. In

years of sub-normal rainfall, the effect of anti-transpirants and moisture conservation by tied-ridging was observed.

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EVALUATION OF MAIZE AS FODDER AND GRAIN INTERCROP IN LUCERNE STAND

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Field experiments were conducted during 1980-82 at the experimental farm of Tamil Nadu Agricultural University, Coimbatore, to study the possibility of raising intercrops in lucerne (*Medicago sativa* L.) and the effect of N and P application. The treatments consisted of pure lucerne, pure fodder maize, pure grain maize and lucerne plus fodder maize/grain maize association. To the mixed stand, nine combinations of three levels each of N and P (0.30 and 60 kg N/ha 0, 12.5 and 25 kg P₂O₅/ha) to maize fodder crop, (0, 60 and 120 kg N/ha and 0.30 and 60 kg P₂O₅/ha) to grain maize were applied. Lucerne + fodder maize association produced 45.9 and 37.7 per cent higher total DMP/year than pure lucerne and pure fodder maize respectively. Lucerne + grain maize stand resulted in 30.9 per cent higher DMP/year than pure lucerne. The reduction in the total DMP/year in lucerne + grain maize stand is only 4 per cent as compared to pure grain maize.

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