Madras Agric. J. 79 (8) : 427 - 430 August 1992
https://doi.org/10.29321/MAJ.10.A01773

# THE EFFECT OF ANTI - TRANSPIRANTS ON THE YIELD OF COTTON

S. SUBRAMANIAN[1] and N. MOHAMED SHERIFF[2]

## ABSTRACT

An experiment in cotton MCU.7 was conducted to study the effect of anti transpirants like Kaolin, PMA, Cowdung slurry, Gurel, Liquid paraffin, Sandovit, Power Oil and Lime wash on the Kapas yield and its components, for three years from summer 1986 to 1988. The treatment differences for kapas yield, number of symposia/plant and number of bolls/plant were significant. Consistently higher kapas yield was obtained in the plots sprayed with Kaolin 3%. The crop received Liquid paraffin 1%, Cowdung slurry 5% and Gruel 1% sprays were also recorded considerably higher kapas yield. The ancillary data revealed that the higher kapas yield would have been achieved through number of symposia and number of bolls contributed by the physiological factors like high RWC and low stomatal count.

Reduction in the transpiration value increases the water use efficiency of plants. Water use efficiency is a measurable manifestation for evaluation of water balance of a crop as it reflects the yield of marketable crop produced per unit of water used in evapo-transpiration (Mathur, 1987). The concept of chemical antitranspirants to increase leaf diffusion resistance by closing stomata metabolically, or coating the leaves with a material impermeable to water vapour was discussed by earlier workers (Gale and Hagar, 1966, Davenport, 1967 and Das and Raghavendra, 1979). An antitranspirant for use on watersheds should be long lasting, cheap and non-toxic (McLaren, 1982). To study the role of easily available antitranspirants on various physiological aspects (RWC & stomatal frequency) as well as the yield of seed cotton and its components, the present investigation was undertaken.

## MATERIALS AND METHODS

An experiment was conducted with cotton MCU.7 for three years from summer 1986 to summer 1988 under irrigated conditions at Cotton Research Station, Tamil Nadu Agricultural University, Srivilliputtur. The experiment was laid out in RBD, replicated thrice adopting the plot size 3 x 3m. The following nine treatments were given as foliar spray during peak flowering and boll development stage Kaolin 3% (reflecting), Phenyl Mercuric Acetate (metabolic inhibitor) $10^{-7}$ molar, Cowdung slurry 5%, Gurel 1%, Liquid Paraffin 1%, Sandovit 0.1%, Power Oil 0.1% and Lime wash 0.1% besides control. Relative water content (RWC)

1 Associate Professor (Crop Physiology)

2 Professor and Head, Cotton Research Station, Srivilliputtur - 626 125

and number of stomata per unit area were worked out during appropriate stages. Data were collected on kapas yield number of symposia/plant and number of bolls/plant at harvest. The mean observations from 5 plants in each replication for each treatment were taken for the analysis of the ancillary traits. In the case of stomatal count, the mean number of 5 observations from the 20X x 10X microscopic visible surface area was considered.

## RESULTS AND DISCUSSION

Kapas yield, number of symposia/plat and number of bolls/plant showed significant differences among the treatments during 1986 and 1987 which was non-significant during 1988. The treatment which received Kaolin 3% spray recorded consistently higher kapas yield during all the years (2981, 1892 and 1508 Kg/ha) which was closely followed by Liquid paraffin spray. Cowdung slurry (5%) and Cruel (1%) spray were also found to have improved the kapas yield considerably than the control. A close examination on the other ancillary data (Table 2) revealed enhanced number of symbodia, number of bolls and relative water content and a substantial reduction in stomatal number, in the treatments which exhibited superior yield performance. Thandapani and Subharayalu (1986) observed a positive relationship between high RWC and enhanced yield in rained cotton.

TABLE 1 : Role of Anti - Transpirants on the kapas yield

| Treatment | | Kapas yield (in kg/ha) | | | Mean | Percentage on control |
|---|---|---|---|---|---|---|
| | | 1986 | 1987 | 1988 | | |
| 1. | Cowdung slurry 5% spray | 2726 | 1481 | 1404 | 1870 | 112.0 |
| 2. | Gruel 1% spray | 2836 | 1481 | 1289 | 1869 | 111.9 |
| 3. | Liquid paraffin 1% spray | 2883 | 1617 | 1484 | 1995 | 119.5 |
| 4. | Sandovit 0.1% spray | 2651 | 1372 | 1078 | 1700 | 101.8 |
| 5. | Phenyl Mercuri Acetate $10^{-7}$ molar | 2444 | 481 | 1006 | 1310 | 78.5 |
| 6. | Kaolin 3% spray | 2981 | 1892 | 1508 | 2127 | 127.4 |
| 7. | Power Oil 0.1% spray | 2744 | 1389 | 1306 | 1813 | 108.6 |
| 8. | Lime wash 0.1% | 2526 | 1413 | 1311 | 1750 | 104.8 |
| 9. | Control (No spray) 2574 | 1303 | 1132 | 1670 | 100.0 | |
| | S.E. | 111.0 | 88.3 | 161.1 | - | - |
| | C.D. | 332.7 | 264.8 | NS | - | - |
| | C.V. % | 7.9 | 11.1 | 22.3 | - | - |

TABLE 2 : Role of Anti-Transpirants on the Ancillary Characters in Cotton

| | | Mean No. of symbodia per plant | | | | Mean No.of bolls/plant | | | | RWC % | | | | No. of stomata per Unit area | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1986 | 1987 | 1988 | Mean | 1986 | 1987 | 1988 | Mean | 1986 | 1987 | 1988 | Mean | 1986 | 1987 | 1988 | Mean |
| 1. | Cowdung slurry 5% spray | 16.2 | 15.1 | 15.3 | 15.5 | 17.9 | 15.6 | 13.5 | 15.7 | 81 | 80 | 82 | 81.0 | 32 | 30 | 31 | 31.0 |
| 2. | Gruel 1% spray | 16.8 | 18.4 | 15.0 | 16.7 | 18.4 | 19.0 | 11.1 | 16.2 | 84 | 81 | 83 | 82.7 | 29 | 30 | 30 | 29.7 |
| 3. | Liquid Paraffin 1% spray | 17.0 | 16.6 | 13.2 | 15.6 | 20.2 | 15.2 | 16.7 | 17.4 | 86 | 81 | 85 | 84.0 | 28 | 28 | 29 | 28.3 |
| 4. | Sandovit 0.1% spray | 15.9 | 15.1 | 13.7 | 14.9 | 18.4 | 14.0 | 13.4 | 15.3 | 80 | 76 | 79 | 78.3 | 34 | 32 | 30 | 32.0 |
| 5. | PMA 10-7 molar | 15.0 | 9.6 | 15.5 | 13.4 | 15.4 | 7.2 | 14.2 | 12.3 | 84 | 78 | 84 | 82.0 | 33 | 34 | 32 | 33.0 |
| 6. | Kaolin 3% spray | 18.0 | 14.6 | 15.5 | 16.0 | 21.0 | 16.7 | 17.2 | 18.3 | 82 | 82 | 83 | 82.3 | 30 | 26 | 28 | 28.0 |
| 7. | Power oil 0.1% spray | 16.5 | 13.4 | 15.4 | 15.1 | 15.7 | 14.0 | 13.1 | 14.3 | 71 | 75 | 73 | 73.0 | 37 | 30 | 30 | 32.3 |
| 8. | Lime wash 0.1% | 15.7 | 13.8 | 15.1 | 14.9 | 14.9 | 14.7 | 11.6 | 13.7 | 75 | 74 | 76 | 75.0 | 36 | 31 | 32 | 33.0 |
| 9. | Control (No spray) | 15.0 | 12.7 | 14.6 | 14.3 | 17.1 | 12.7 | 16.0 | 15.3 | 72 | 72 | 73 | 72.3 | 40 | 36 | 36 | 37.3 |
| | S.E. | 0.90 | 0.55 | 0.77 | - | 1.4 | 0.40 | 2.4 | - | - | - | - | - | - | - | - | - |
| | C.D. | 2.7 | 1.65 | NS | - | 4.2 | 1.19 | NS- | - | - | - | - | - | - | - | - | - |
| | C.V. % | 10.1 | 6.6 | 9.05 | - | 13.4 | 4.83 | 29.7 | - | - | - | - | - | - | - | - | - |

Mathur (1987) obtained maximum yield with Kaolin (6%) spray in rape seed and mustard due to high net assimilation rate and high water use efficiency. Turner and Wagoner (1968) reported a reduction of water consumption in repine due to the application of phenylmercuric acetate. In the present study spraying of PMA did not show a positive influence on the kapas yield in cotton.The high kapas yield due to the spraying of the antitranspirants might have expressed through bolls and symbodia, which were in turn contributed by physiological factors like increased RWC and low stomatal count.

## REFERENCES

DAS, V.S.R. and RAGHAVENDRA, A.S. 1979. **Outlook on Agriculture, 10 :** 92-98.

DAVENPORT, D.C. 1967. **Journal of Experimental Botany, 18 :** 332-347.

GALE, J.A. and Hagan, R.M. 1966. **Annual Review of Plant Physiology, 17 :** 269-282.

MATHUR, C.M. 1987. **Journal of Oilseeds Research, 4 :** 283-285.

McLAREN, J.S. 1982. **Chemical Manipulation of Crop Growth and Development.** Butterworth Scientific, London.

THANDAPANI, V. and SUBHARAYALU, M. 1986. Effect of pre-sowing seed treatment with chemicals and growth regulators for drought tolerance and yield of cotton under rained condition. **Madras Agricultural Journal, 73 :** 668-675.

TURNER, N.C. and WAGONER, P.E. 1968. **Plant physiology, 43 :** 973-978.

Madras Agric. J. 79 (8) : 430 - 436 August 1992

# GROWTH AND YIELD OF WINTER MAIZE INTER CROPS UNDER IRRIGATION AND PATTERN OF SOWING

T.N. PRASAD and U.K. PRASAD

## ABSTRACT

In a trial conducted at Rajendra Agricultural University Farm with three irrigation levels(0.4, 0.6 and 0.8 IW : CPE ratios), two crop geometries (single and paired rows) and three intercrops (mustard radish, and coriander) along with a sole crop of maize, the inter-cropping of mustard or radish with winter maize resulted in higher yield equivalence as compared to coriander or pure crop of maize. Among irrigation levels 4 or 5 irrigations either through IW : CPE ratio of 0.6 or 0.8 gave higher yield in comparison to irrigations

Rajendra Agricultural University, Pusa - 848125, Bihar