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Effect of Weed Control Under Different Moisture Levels on Maize

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ABSTRACT

A field experiment conducted to study the effect of weed control under different moisture levels on maize indicated that pre-emergence spray of atrazine was effective in controlling dicot weeds and to a certain extent monocot weeds. There was increase in yield of grain and straw at 80 per cent available soil moisture regime. There was increase in yield of grain in weeded plots over no-weeding while there was phenomenal increase in yield of straw in herbicide applied plot over hand weeded and un-weeded plots. There was significant interaction between moisture levels and the effect of weeds on the crop.

INTRODUCTION

Weeds reduce crop yields on account of their competition with crops for water, nutrients and light. Moisture lost by transpiration through weeds is often much greater than that lost by evaporation, surface run off or deep seepage (Arakeri *et al.*, 1959). In non-irrigated areas the competition between weeds and crops is largely for water while in irrigated tracts, the competitions is severe for nutrients. The present study is to find out the effect of weed control under different moisture levels on maize.

MATERIALS AND METHODS

To study the effect of available soil moisture and weed control on maize, a field experiment was laidout in split plot design at Agricultural College, Coimbatore, with maize Hi-starch as test crop. The plots were given uniform doses of manures and NPK fertilizers. The modern concept to give irrigation according to the available soil moisture content in the soil was followed in the study.

The estimated moisture content between the wilting point (10.24 per cent) and the field capacity (20.84 per cent) of the soil under study was taken as available moisture range to the plants. Five levels of available soil moisture range viz; 0, 20, 40, 60 and 80 per cent as treatments were tried and they were maintained by measured quantities of irrigation water. The amount of rainfall received was also

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taken into account and the moisture levels were maintained up to the 90th day of the crop.

Taking the five levels of available moisture as the main treatments, weeding treatments viz. (1) No weeding (Control) (S_1), (2) Hand weeding twice (S_2), and (3) chemical weeding by pre-emergence spray of atrazine at 2.471 kg/ha (S_3) were tried as sub-plot treatments.

On thirtieth day after sowing the sub plots allotted for hand weeding were worked with hand hoes and weeds were removed. The second weeding was done in the same plots on the sixtieth day after sowing. The weeds were collected thrice, on the 30th and 60th days and at harvest stage of the crop from the hand weeded plots, and weeds collected after harvest from the non-weeded plots and herbicide applied plot were dried, weighed

TABLE 1. Dry weed weight and yields of maize grain and straw under different moisture levels and weeding treatments

Miosture levels	Available moisture per cent	Total dry weed weight (g/2 s. feet)	Grain (kg/ha)	Straw (kg/ha)
I_0	0	16.80	1058.19	12036.98
I_1	20	17.30	2129.61	14867.60
I_2	40	19.37	3002.62	13690.36
I_3	60	20.25	3399.44	16408.59
I_4	80	22.40	4444.41	16230.02
Weeding Treatments				
S_1		23.00	2103.16	13114.97
S_2		25.03	2883.57	14351.73
S_3		9.93	2827.54	16468.11
S. E.		3.33	251.40	396.95
C. D.		9.60		1144.53
F. Test		Significant	Not Significant	Significant

and the data scrutinised statistically. The yields of grain and straw under different moisture levels and weeding treatments were also recorded and the data were analysed statistically.

RESULTS AND DISCUSSION

The weeds were mostly of *Trianthema portulacastrum* and in the herbicide applied plot only sparse growth of monocot weeds appeared after 45 days.

There was an increasing trend of dry matter yield of weeds under higher moisture levels but statistically the increase was not significant. The dry weed weights of hand weeding and non-weeding treatments were on a par. Dry weed weight was significantly lesser in the herbicide applied plot (Table 1.)

Pre-emergence application of atrazine was found most effective in controlling broad leaved dicot weeds and to certain extent monocot weeds in the maize crop. The weed dry matter production was highest in the hand weeded plot closely followed by no-weeding treatment in the discending order. This may be due to the frequent removal of weeds which facilitated the better establishment of the remaining weeds in the hand weeded plot. The effectiveness of atrazine in controlling the weeds was most satisfactory and this is in agreement with the findings of Moolani (1965), Palatinus (1968) and Singh *et al*, (1969

Grain yield indicated that the highest moisture level gave the highest grain yield being superior to all other lower moisture levels. The treatements 60 and 40 per cent moisture levels were on par and superior to 20 and 0 per cent available moisture levels. With regard to weeding treatments, the atrazine treated plot gave the highest yield though not significantly higher than the hand weeded and unweeded plots. There was a decrease of about 780 kg/ha in yield in the un-weeded treatment over weeded treatments. The interaction between the moisture

TABLE 2. Interaction between moisture levels and the effect of weeds on straw yield (kg/plot)

Weed treatments	Moisture levels	I_0	I_1	I_2	I_3	I_4	C. D.
	S_1	12.62	16 81	22.19	23.41	24.12	
	S_2	16 81	23.12	19.12	26.00	23.44	5.547
	S_3	25.19	27.50	20.69	25.12	26.00	
	C. D.	3.862					

levels and the weeding treatments were not significant in grain yield.

The straw yield was significantly higher in the higher moisture levels as compared to lower moisture levels. The treatments of 80 per cent and 60 per cent available moisture levels were on par and superior to zero per cent available moisture. The lower moisture levels viz. 40, 20 and 0 per cent available moisture levels were also on par in respect of straw yield.

With regard to the weeding treatments, the straw yield was significantly higher in the herbicide treated plot and was significantly higher in the hand weeded plot than the non-weeded plot.

The interaction between the weeding treatments and the moisture levels was significant (Table 2). In the lower moisture levels viz 20 and 0 per cent available moisture, levels there was increased straw yield in the atrazine treated plot followed by hand weeded and unweeded plot. But, in the higher moisture levels, the unweeded plot had given as good a straw yield as in the atrazine treated plot and the hand weeded plot. This clearly showed that at the higher soil moisture levels the crop was able to complete with the weeds in getting the water and nutrients. In the lower moisture levels the atrazine treated plot and the hand weeded plot had given higher straw yield due to the eradication of weeds resulting in the more availability of moisture and nutrients which was reflected in the straw yield. Similar results have been reported by Misra and Vijayakumar (1962). Moolani (1965) observed that the reduction in dry matter yield of crop was proportional to the increase in yield of weeds.

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