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Effect of Fluchloralin and Farm Yard Manure on Soil Microflora

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ABSTRACT

A field experiment was carried out at Bidi Tobacco Research Station, Anand during 1994-95 to find out the effect of fluchloralin and farm yard manure on the soil microflora. Bacterial and fungal population in the soil was significantly decreased over control due to fluchloralin application at both the recommended (1.5 kg ha^{-1}) and double the recommended dose (3.0 kg ha^{-1}). However, the effect last only upto 10 days after application. Addition of FYM @ 5.0 t ha^{-1} significantly increased bacterial and fungal population. The interaction effect of levels of fluchloralin and farm yard manure on soil microbial population at 3 hr after application was significant.

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INTRODUCTION

Application of herbicides has become inevitable due to paucity of labourers. But their use alters the delicate balance of various types of soil micro-organisms, which are required for efficient use of nitrogen, carbon and other minerals. Sidhu *et al.* (1985) have also reported suppressing effect of fluchloralin application on soil microflora upto 7 days. Soil organic matter has a high cation exchange capacity as well as high specific surface area, hence absorption of herbicides on soil varies with different levels of organic matter. But information on fluchloralin application with and without FYM on microbial population is not available, hence, the present investigation was planned.

MATERIALS AND METHODS

The field experiment was conducted in Randomized Block Design with four replications in a permanent plot of 1.2 m x 1.2 m size, at Bidi Tobacco Research Station, Gujarat Agricultural University, Anand during *rabi* 1994-95. The soil was loamy in texture, alkaline in reaction (pH 8.14), high in organic carbon (0.86%), optimum in electrical conductivity (0.30 dSm^{-1}) and high in available phosphorus (59.6 kg ha^{-1}) and potassium (420.2 kg ha^{-1}). Fluchloralin (Basalin 45% EC) was applied as pre-plant incorporation treatments @ 0, 1.5 and 3.0 kg ha^{-1}. Farm yard manure was mixed well with soil in the respective treatments and fluchloralin was applied after 10 days of FYM incorporation. Five irrigations were given

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TABLE 1

Effect of fluchloralin and FYM on soil microbial population.

Treatment	Bacteria (X 10^5 /g soil)					Fungi (X 10^3/g soil)				
	Days after application					Days after application				
	0	10	20	30	60	0	10	20	30	60
Fluchloralin levels										
Control	3.75	5.60	5.63	6.69	7.85	2.31	1.60	1.10	1.14	1.83
1.5 kg ha^{-1}	3.24	3.8	5.18	5.87	7.45	2.01	0.84	1.03	1.01	1.64
3.0 kg ha^{-1}	2.90	2.29	5.15	5.81	7.38	1.75	0.73	1.01	1.09	1.60
S. Em. ±	0.064	0.158	0.139	0.272	0.351	0.058	0.064	0.087	0.075	0.081
C. D. 0.05	0.194	0.477	NS	NS	NS	0.174	0.194	NS	NS	NS
Farm Yard Manure										
0 t ha^{-1}	2.73	3.78	5.18	6.14	7.45	1.61	0.93	0.87	0.93	1.60
5 t ha^{-1}	3.86	4.67	5.45	6.10	7.65	2.44	1.18	1.20	1.29	1.78
S. Em. ±.	0.053	0.129	0.114	0.222	0.287	0.047	0.053	0.071	0.062	0.066
C. D. 0.05	0.158	0.389	NS	NS	NS	0.142	0.158	0.213	0.185	NS
Interaction	Sig.	NS	NS	NS	NS	Sig.	NS	NS	NS	NS
C.V. %	5.5	10.6	7.4	12.6	13.1	8.0	17.3	23.4	19.2	13.6

during the study. Soil samples were collected on 0, 10, 20, 30 and 60 days after application and analysed immediately after sampling.

The samples were analysed for enumeration of total population of bacteria and fungi using Dilution Plate Technique. Ten fold serial dilutions were made in sterile water and suitable dilutions were plated using streptomycin Potato Dextrose Agar (PDA) and nutrient agar media (N-agar) for fungi and bacteria, respectively. The plates were incubated at 27°C for fungi and 30°C for bacterial counts. Counting was done and expressed as colonies forming units per gram of soil.

RESULTS AND DISCUSSION

Effect of fluchloralin on bacterial and fungi population

Application of fluchloralin at both the levels had inhibitory effect on bacterial as well as fungal population and the effect was noticed upto 10 days after application (Table 1) indicating thereby the herbicidal influence upto 10 days. Sidhu *et al.* (1985) have also reported suppression of soil microflora up to 7 days due to fluchloralin application. Effect due to fluchloralin was more pronounced on fungi than bacteria. Fungal population started building up after 20 days of its application.Thus, the deleterious effect of the herbicide on soil microbes persisted only upto 10 days after application.

Effect of farm yard manure on bacterial and fungal population

In the present study, addition of FYM @ 5 t ha^{-1} significantly increased bacterial population over control on the same day and 10th day of application of fluchloralin. While fungal population was significantly higher upto 30 days. Microbial population was higher in FYM treated plots over control at all the intervals. These results are in confirmity with those of Patel (1990).

Interaction effect

The interacation effect of levels of fluchloralin and FYM was significant in modifying

TABLE 2

Interaction effect of fluchloralin and FYM on soil microbial population (3 hrs after spraying).

Levels of FYM	*Levels of fluchloralin (kg ha^{-1})*		
	0	*1.5*	*3.0*
	Bacterial counts (x 10^5/g soil)		
0 t ha^{-1}	3.35	2.60	2.23
5 t ha^{-1}	4.15	3.88	3.58
S. Em.	0.091		
C. D.	0.275		
	Fungal counts (x 10^3/soil)		
0 t ha^{-1}	1.78	1.58	1.48
5 t ha^{-1}	2.85	2.45	2.03
S. Em.	0.081		
C. D.	0.246		

the bacterial and fungal counts in soil immediately after application of the herbicide (Table 2). However, it was non-significant at the latter stages.

Reduction observed in soil microbial population upto 10 days after fluchloralin incorporation is unlikely to alter the growth and development of agricultural crops hence, use of fluchloralin for weed management under loamy soil condition of middle Gujarat appears to be safe.

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