

Relative Efficiency of Herbicides in Maize + Cowpea Intercropping System for Green Fodder

V. Laxmi Praveen and V. B. Bhanu Murthy

Department of Agronomy

Acharya N. G. Ranga Agricultural University, Rajendranagar-500 030, Hyderabad (A. P.), India

Intercropping of cereal and legume fodders is a good practice as the benefits include improved herbage quality, increased biomass production and economic use of fertilizers besides efficient utilization of land and minimizing risk due to aberrant weather. Weed control in this intercropping system by mechanical methods is difficult because of closer spacing and hand weeding will not be cost effective. Chemical weeding would be simple and easy provided the herbicide is safe to both the crops in addition to checking the weeds found in that ecosystem. In this study, it is attempted to identify a suitable herbicide for maize + cowpea intercropping system for green fodder. The study was made during **kharif** 2000 at Livestock Research Institute of Acharya N. G. Ranga Agricultural University, Rajendranagar, Hyderabad on a sandy clay loam soil. There were 10 treatments consisting of different herbicides, inter cultivation, hand weeding and unweeded control (Table 1). Experiment was laid out in randomized block design with three replications. The variety of maize was APFM-2 and cowpea variety was EC-4216. Maize and cowpea were grown adopting 2 : 2 ratio with uniform row spacing of 30 cm. The crops were sown on July 1, 2000 and harvested on September 15, 2000. Herbicides were sprayed uniformly using hand compression sprayer fitted with flat fan nozzle. All the herbicides were sprayed 24 h after sowing, except fluchloralin which was sprayed and incorporated one day before sowing.

Weed flora of the experimental field consisted of *Cynodon dactylon*, *Digitaria sanguinalis*, *Cyperus rotundus*, *Acalypha indica*, *Amaranthus viridis*, *Celosia argentic*, *Cleome viscosa*, *Commelina benghalensis*, *Digera arvensis*, *Euphorbia hirta*, *Lagasca mollis*, *Leucaena*

leucocephala, *Parthenium hysterophorus*, *Phyllanthus niruri*, *Tridax procumbens* and *Trichodesma indicum*. The sedge weed *C. rotundus* was the dominant weed constituting about 30% of the total weed population. However, all broad-leaved weeds put together were more than half of the total population.

Atrazine effectively controlled the grass weeds *C. dactylon* and *D. sanguinalis* and the broad-leaved weeds viz., *C. argentic*, *C. viscosa*, *C. benghalensis*, *P. hysterophorus*, *P. niruri* and *T. procumbens* for the first 40 days, but *A. viridis* and *A. indica* emerged later. This herbicide was least effective on *C. rotundus*. Atrazine and oxyfluorfen totally checked the sprouting of *P. hysterophorus* upto harvest. Considering the total weed dry weight, alachlor and metolachlor appeared to be highly effective (Table 1). Pendimethalin, fluchloralin and butachlor effects appeared more or less similar to that of hand weeding or inter cultivation.

None of the herbicides had adverse effect on the emergence and initial crop stand of maize. Green fodder yield of maize was highest with atrazine followed by that with oxyfluorfen. The remaining herbicides were comparable for green fodder yield of maize. All the herbicides were found to be better than manual weeding or inter cultivation considering the maize yields.

There was complete kill of cowpea with atrazine. It did not inhibit the germination of cowpea, but all plants showed epinasty symptoms 10 days after sowing and were completely killed within few days and these results confirm that atrazine cannot be used in intercropping system involving legume like cowpea. Oxyfluorfen was also found to be phytotoxic to cowpea. More than one third population got killed in a span of 10 days.

Table 1. Effect of treatments on total weed density, weed dry weight at harvest, green fodder yield and total crude protein yield

Treatment	Dose (kg ha ⁻¹)	Time of application	Total weed density (No. m ⁻²)	Weed dry weight (g m ⁻²)	Green fodder yield (t ha ⁻¹)			Total crude protein yield (kg ha ⁻¹)
					Maize	Cowpea	Total	
Atrazine	1.0	Pre-emergence	108	26.0	22.6	0.0	22.6	698
Pendimethalin	1.0	Pre-emergence	89	15.5	15.0	12.8	27.8	996
Alachlor	1.0	Pre-emergence	76	10.3	16.0	14.3	30.3	1031
Metolachlor	1.0	Pre-emergence	43	6.9	17.7	14.9	32.6	1065
Butachlor	1.0	Pre-emergence	94	12.5	15.0	13.6	28.6	1023
Oxyfluorfen	0.1	Pre-emergence	107	23.6	19.5	7.8	27.3	849
Fluchloralin	1.0	PPI	116	19.6	15.5	11.3	26.8	897
Hand weeding	-	20 DAS	123	22.8	12.4	11.5	23.9	857
Inter cultivation	-	20 DAS	143	24.4	10.6	10.3	20.9	833
Weedy	-	-	198	41.7	7.6	9.7	17.3	766
LSD (P=0.05)	-	-	59	18.1	2.5	2.7	8.7	24

PPI—Pre-plant incorporation, DAS—Days after sowing.

All the acetamide herbicides viz., metolachlor, alachlor and butachlor were highly safe to cowpea and resulted in higher green fodder yields of this crop (Table 1). The performance of cowpea with pendimethalin and fluchloralin was not different from that with manual or mechanical methods, primarily because of poor weed control compared to metolachlor.

Considering the total green fodder yield from the system, all the herbicides except atrazine were found to be equally effective as the differences were non-significant. Combined green fodder yield with metolachlor was higher by 7.5% as compared to that with alachlor, the next best herbicide. And compared

to butachlor, the yield increase was to a tune of 14%, which by all means is substantial. Similar results were reported in maize+blackgram intercropping system by Sharma and Nayital (1993). In the present study, better performance of metolachlor was clearly evident when crude protein yield was taken into account.

REFERENCE

- Sharma, J. and S. C. Nayital, 1993. Weed management in maize+blackgram intercropping in mid-hills sub-humid zone of Himachal Pradesh. *Indian J. Weed Sci.* 25 : 43-46.