

Economics of weed control in mulberry (*Morus indica*)

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ABSTRACT

A field experiment during the rainy (*kharif*) and winter (*rabi*) seasons of 1991–92 on red sandy clay-loam soil on mulberry (*Morus indica*) revealed that the weed-free check significantly outyielded the herbicides-treated plots. However, considering the cost of weed-control treatments alone, all the herbicides under trial showed higher benefit : cost ratio than weed-free check. Out of the evaluated herbicides, diuron and metolachlor were found most economical compared with the rest of the herbicides.

The final choice of any weed-control measure will depend largely on effectiveness and economics. The cost of weed control must be compared with the resulting increased value of the crop. Mulberry (*Morus indica*) is no exception to this. Although the age-old practices like intercultivation and hand-weeding controlled the weeds effectively, often they are tedious, labour consuming and expensive. On contrary, the herbicides usage offer an effective and economical means of reducing weed competition, crop losses and production losses (Kasiviswanathan *et al.*, 1978). Hence an attempt was made to work out the comparative economics among different weed-control treatments.

MATERIALS AND METHODS

The field experiment was conducted at University of Agricultural Sciences, Bangalore, during the rainy (*kharif*) and winter (*rabi*) seasons of 1991–92. The soil of the experimental site was red sandy-clay

loam with high organic carbon (0.38%), low in nitrogen (188 kg/ha) and phosphorus (18.4 kg/ha) but medium in available potassium (224 kg/ha). The pH of the experimental soil was 6.2.

The experiment was laid out in randomized complete-block design with 3 replications. Seven herbicides, viz. diuron, butachlor, isoproturon, alachlor, metolachlor, pendimethalin and oxyfluorfen, each at 2 levels as pre-emergent sprays, were integrated with weed-free check and unweeded control, resulting in all 16 treatments. 'Kanav 2' ('M 5') was selected for the experiment and all the plots were uniformly fertilized at 300 kg N, 120 kg P₂O₅ and 120 kg K₂O/ha/year. Out of which, 60 kg N/ha was top-dressed after the harvest of each crop in a year. Herbicides were applied on next day after bottom pruning by using knap-sack sprayer. The herbicidal spray was taken only for first crop. Irrigation was provided as per the schedule. The gross returns were calculated by pricing leaf yield at

Re 1.0/kg and cocoons at Rs 100/kg. The wages of labourers were worked out at Rs 16.6/day and Rs 16.0/day for men and women respectively.

RESULTS AND DISCUSSION

The highest weed dry weight was recorded with unweeded check (Table 1). Among the herbicidal treatments, diuron @ 1.25 kg/ha and metolachlor @ 1.5 kg/ha were very effective in reducing the dry weight of weeds. The highest weed-control efficiency was noticed with diuron @ 1.25 kg/ha, followed by metolachlor @ 1.5 kg/ha. The leaf yield differed significantly due to weed-control treatments (Table 1). The highest leaf yield was recorded with weed-free check, followed by diuron @ 1.25 kg, metolachlor

@ 1.5 kg and butachlor @ 1.5 kg/ha, whereas the increase (%) in leaf yield over unweeded check was 0–214%. Among the different weed-control treatments, weed-free check, diuron (1.25 kg/ha) and metolachlor (1.5 kg/ha) increased the leaf yield by 214, 195 and 189% respectively over the unweeded check.

However, considering the cost of weed-control treatments alone, the herbicidal treatments showed higher benefit : cost ratios (10.4–26.0) relatively compared with weed-free check (8.8). Although the weed-free check recorded higher leaf yields and gross returns, the obtained benefit : cost ratio was less due to higher labour costs. Among the herbicidal treatments, diuron @ 1.0 kg and 1.25 kg/ha (25.6 and 25.2 respectively)

Table 1. Economics of weed control in mulberry

Treatment	Herbicide rate (kg/ha)	Weed dry-weight (kg/ha)	Weed-control efficiency (%)	Leaf yield* (kg/ha)	Net returns (Rs/ha)	Benefit : cost ratio
Weed-free check		0.0	100.00	8,378.80	19,755.8	8.8
Diuron	1.00	802.33	75.74	7,223.0	19,626.2	25.6
Diuron	1.25	574.66	82.66	7,871.9	21,526.5	25.2
Butachlor	1.25	1,028.33	68.53	6,300.5	84,38.5	17.6
Butachlor	1.50	732.67	77.90	6,598.5	13,242.3	17.0
Isoproturon	1.25	1,339.00	58.60	4,305.7	4,34.6	11.9
Isoproturon	1.50	908.67	72.32	4,452.0	431.0	10.4
Alachlor	1.25	1,044.33	67.87	4,986.6	8,109.3	19.5
Alachlor	1.50	691.67	79.31	6,303.3	12,600.7	21.0
Metolachlor	1.25	765.33	76.78	6,982.8	17,462.2	25.1
Metolachlor	1.50	588.33	82.43	7,752.0	22,428.2	26.0
Pendimethalin	1.25	1,014.33	69.22	5,184.7	9,362.7	19.1
Pendimethalin	1.50	749.67	77.38	5,660.0	13,330.2	21.1
Oxyfluorfen	0.12	1,144.67	65.07	4,942.5	3,231.3	15.3
Oxyfluorfen	0.25	807.00	75.49	5,358.5	5,339.8	14.2
Unweeded check		3,325.00	0.00	2,668.3	5,375.2	
CD (P = 0.05)		62.13	1.74	768.4		

*Mean data of 2 seasons

and metolachlor @ 1.25 kg and 1.5 kg/kg (25.1 and 26.0 respectively) resulted in higher benefit : cost ratios. This might be due to higher leaf and cocoon yields besides the lower cost involved in control of weeds, which in turn resulted in higher net returns, whereas the lower benefit : cost ratio with isoproturon @ 1.25 and 1.50 kg/ha (11.9 and 10.4, respectively), may be attributed to the lower leaf yield and cocoon yields, besides the higher cost of herbicide involved in control of weeds. This is in agreement with the findings of Muniyappa (1990). The herbicide diuron and metolachlor at both the

levels were found economical compared with rest of the herbicides.

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