

Effect of Cultural and Chemical Methods on Weeds and Fruit Yield of Green Chilli (*Capsicum annum* L.)

R. B. Patel, T. N. Baredadia, B. D. Patel and M. I. Meisuriya

AICRP on Weed Control, B. A. College of Agriculture
Anand Agricultural University, Anand-388 110 (Gujarat), India

Chilli is an important vegetable-cum-spice crop of India. Chilli crop encounters heavy weed infestation during the rainy season due to its slow growth after transplanting. Depending upon the weed flora and intensity of weeds, fruit yield losses range between 60 to 70% in chilli crop. Manual weeding and hoeing is efficient but it is a time consuming and difficult during rains and scarcity of labour due to paddy transplanting at same time. Integrated method of weed control seems to be only solution in long duration crop. Hence, an attempt was made to study the effect of various herbicides applied at different stages in chilli crop.

Field study was conducted at AICRP on Weed Control, Gujarat Agricultural University, Anand for three consecutive **kharif** seasons (1996-97 to 1998-99). The soil of the experimental field was sandy loam in texture, low in organic carbon (0.3%), high in available phosphorus (58.3 kg ha⁻¹) and potassium content (447.2 kg ha⁻¹) with a pH of 8.10. Treatments were laid out in randomized block design with four replications having plot size 6.0 m x 3.0 m. Treatments consisted of fluchloralin, pendimethalin and metolachlor each at 1.0 kg ha⁻¹, oxadiazon at 0.5 kg ha⁻¹ and oxyfluorfen at 0.24 kg ha⁻¹ applied before transplanting (DBTP) and after transplanting (DATP) combined with one hand weeding (HW) at 45 days after transplanting, black polyethylene mulch, three HW at 15, 45 and 75 DATP, three HW and hand hoeing (HH) at 15, 45 and 75 DATP and unweeded check (Table 1). Herbicides were applied at spray volume of 500 l water ha⁻¹ using knapsack sprayer fitted with a flat fan nozzle. Four weeks old healthy seedlings of chilli (cv. Pusa Jwala) were transplanted at a spacing of 60 cm x 60 cm in August during every season. The crop was raised under recommended package of practices. Green chilli fruits were collected and recorded by eight pickings during crop growth period.

The field was infested with *Dactyloctenium aegyptium* (43%), *Eragrostis major* (16%), *Digitaria sanguinalis* (15%), *Cyperus rotundus* (11%), *Boerhavia diffusa* (6%), *Phyllanthus niruri*, *Euphorbia hirta* and *Tribulus terrestris*. Dry weed weight (Table 1) recorded at 45 days after transplanting was significantly lower in three HW and was at par with three hand weedings and hand hoeing and application of pendimethalin at 1.0 kg ha⁻¹ as pre-transplant supplemented with HW at 45 DATP. Weed control efficiency was between 89.4 to 97.3% in these treatments. Among herbicidal treatments, significantly lower weed dry weight was recorded in pre-transplant application of pendimethalin, which was at par with all the herbicidal treatments except pre-transplant or post-transplant application of metolachlor due to non-control of *Boerhavia diffusa*.

Post-transplant application of oxadiazon, oxyfluorfen and metolachlor caused phytotoxicity to the crop. Metolachlor applied even as pre-plant showed toxicity on chilli. Crop growth was also severely affected under black polyethylene mulch treatment due to higher soil temperature (41.5°C) as compared to no mulch (37.0°C), which restricted root growth of chilli at early stage. Green chilli fruit yield was significantly higher under three HW and HH, which was at par with all the cultural and chemical treatments, except post-transplant application of fluchloralin, pendimethalin and oxadiazon, pre-transplant application of metolachlor and black polyethylene mulch. Maximum 75.2% yield reduction in chilli was noticed in unweeded check due to weed intensity in **kharif** season.

Three hand weedings and hoeing gave highest net profit (Rs. 65253 ha⁻¹) and BCR (2.68) followed by three hand weedings (Rs. 63053 ha⁻¹) and pre-transplant application of pendimethalin supplemented with hand weeding at 45 DATP (Rs. 60080 ha⁻¹).

Table 1. Effect of treatments on weeds and yield of green chilli (Mean data of three seasons)

Treatment	Dose (kg ha ⁻¹)	Weed dry weight (kg ha ⁻¹) 45 DATP	Green chilli yield (t ha ⁻¹)	Net return (Rs. ha ⁻¹)	Benefit : cost ratio
Fluchloralin	1.0	868	14.52	49823	2.18
Fluchloralin	1.0	834	13.93	46873	2.06
Pendimethalin	1.0	501	16.66	60080	2.58
Pendimethalin	1.0	680	13.88	46078	1.98
Metolachlor	1.0	1213	12.72	40853	1.79
Metolachlor	1.0	1222	14.19	48203	2.12
Oxadiazon	0.5	808	14.56	49523	2.13
Oxadiazon	0.5	674	13.98	46623	2.10
Oxyfluorfen	0.24	887	14.31	48513	2.11
Oxyfluorfen	0.24	820	14.41	49013	2.12
Black polyethylene mulch (100 gauge)	-	620	8.89	16913	0.61
3 HW+3 HH (15, 45, 75 and 75 DATP)	-	148	17.91	65253	2.68
3 HW (15, 45 and 75 DATP)	-	127	17.27	63053	2.71
Weedy	-	4740	4.44	1303	0.06
LSD (P=0.05)	-	459	3.84	-	-

HW-Hand Weeding

HH-Hand hoeing.