Indian J. Weed Sci. **40** (1 & 2) : 85-86 (2008) *Short Communication*

Effect of Irrigation and Weed Management Practices on Weed Control and Yield of Blackgram

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Being a short duration and initially slow growing, blackgram is heavily infested with grasses, broad-leaved weeds and sedges which compete with crop, resulting in yield reduction to the tune of 30-50% (Mishra, 1997). The degree of reduction in yield of blackgram due to weeds depends upon the density and duration of weed species and moisture status of soil. To assess the effect of irrigation schedules and weed management practices on weeds and yield of blackgram, the present study was taken up.

A field experiment was conducted during summer 2004 at S. V. Agricultural College Farm, Tirupati on sandy loam soil with pH 7.6, low in organic carbon (0.22%) and available N (206 kg/ha) and medium in available P_2O_5 (20 kg/ha) and K_2O (178 kg/ha). The experiment was laid out in split plot design replicated thrice with four irrigation schedules viz., I_1- Irrigation at branching and pod development stages, I_2- Irrigation at branching and flowering stages, I_3- Irrigation at flowering and pod development stages and I_4- Irrigation at branching, flowering and pod development stages as main-plots and four weed management practices viz., W_1–Weedy check, W_2–Hand weeding at branching and flowering, W_3–Pre-emergence application of pendimethalin @ 1.5 kg a. i./ha and W_4–Pre-emergence application of metolachlor @ 1.5 kg a. i./ha as sub-plots. A pre-sowing irrigation was given to all the treatments and the remaining irrigations were given as per treatment schedule. Measured quantity of irrigation water depth (5 cm) was delivered at each experimental plot by installing water meter at water outlet. Herbicides were applied with a manually operated knapsack sprayer fitted with flat fan nozzle at a spray volume of 600 l/ha, a day after sowing. Weed density and weed dry matter were

Table 1. Influence of irrigation schedules and weed management practices on weeds and crop

Treatment	Weed density/m^2				Weed dry weight (g/m^2)	WCE (%)	Seed yield (kg/ha)	Net returns (Rs./ha)
	Grasses	Broad-leaved weeds	Sedges	Total				
Irrigation schedules								
I_1	41.53 (6.41)	279.83 (15.44)	20.21 (4.50)	340.73 (17.60)	55.18 (7.05)	66.79	594	4599
I_2	41.26 (6.37)	276.48 (15.28)	20.12 (4.50)	337.85 (17.48	55.23 (7.06)	67.14	796	8037
I_3	40.01 (6.27)	274.41 (15.22)	19.8 (4.45)	333.89 (17.39)	54.33 (6.99)	66.81	405	3055
I_4	41.31 (6.39)	291.89 (15.80)	21.76 (4.66)	354.95 (17.98)	56.22 (7.13)	66.37	853	9286
LSD (P=0.05)	NS	0.05	0.05	0.07	0.05	-	36	-
Weed management practices								
W_1	54.00 (7.38)	539.51 (23.24)	26.66 (5.21)	620.16 (24.91)	110.66 (10.54)	-	480	3469
W_2	21.52 (4.68)	408.1 (20.21)	11.37 (3.44)	439.82 (20.98)	14.98 (3.93)	84.26	831	8388
W_3	40.88 (6.43)	52.32 (7.27)	20.50 (4.58)	113.70 (10.68)	35.16 (5.97)	68.23	743	6206
W_4	47.71 (6.94)	122.68 (11.08)	23.35 (4.88)	193.73 (13.98)	60.15 (7.79)	45.64	595	4813
LSD (P=0.05)	0.15	0.02	0.06	0.04	0.06	-	19	-

recorded at harvest by placing quadrate of 0.5 x 0.5 m (0.25 m^2) size randomly at four places in a plot. The data on weed density and dry weight were subjected to square root transformation ($\sqrt{x + 0.5}$). The test variety LBG-20 was sown on 1 January, 2008 using two seeds/ hill at a spacing of 30 x 10 cm and harvesting was done on 18 March, 2001. The other cultural practices were uniformly applied to all the treatments.

The weed flora in experimental field comprised *Dactyloctenium aegyptium, Digitaria sanguinalis, Cynodon dactylon, Panicum repens, Cyperus rotundus, Celosia argentea, Cleome viscosa, Digera arvensis, Euphorbia hirta, Phyllanthus niruri, Portulaca oleracea* and *Trianthema portulacastrum*. Of the grasses, sedges and broad-leaved weeds, the later group of weeds was very much predominant.

The weed density and dry weight recorded were significantly higher with irrigations scheduled at branching, flowering and pod development stages as compared to other irrigation schedules. This might be due to optimum moisture availability for weeds throughout the crop growth period. The reduction in weed density as well as dry weight with irrigations scheduled at flowering and pod development stages only could be attributed to the moisture stress experienced by the weeds during its early stages. The seed yield and net returns were significantly higher with three irrigations scheduled at branching, flowering and pod development stages. These results are in agreement with those of Sarkar (1992).

All weed management practices caused significant reduction in weed density and dry weight of weeds when compared with weedy check at harvest (Table 1). Application of pendimethalin registered the lowest weed density compared to other weed management practices and was more effective against broad leaved weeds followed by metolachlor. While the grasses and sedges were effectively controlled by hand weeding twice at branching and flowering which might be due to complete removal of weeds by hand weeding. Significantly higher seed yield, weed control efficiency and net returns were recorded with hand weeding twice at branching and flowering followed by pre emergence application of pendimethalin. This may be attributed to reduced weed density and lesser weed biomass production. Similar findings were observed by Choubey *et al.* (1999).

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