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Weed Management in Sugarcane and Mash Intercropping System

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Sugarcane is grown during spring/summer season on considerable area in north India under irrigated conditions and responds to higher doses of fertilizers particularly nitrogen. Long duration, wider spacing and initial slow growth (upto 90 days) of sugarcane alongwith irrigation and sufficiency of nutrients provide favourable environment for the weeds to flourish that adversely affect crop productivity to the extent of 40 to 67% in sugarcane (Singh *et al.*, 1980; Chauhan, 1988).

Wider spacing, slow initial growth and long duration of sugarcane offer scope to grow some suitable short duration intercrop to increase overall productivity of system (Yadav and Prasad, 1990). Mash *(Vigna mungo)* is well adapted to agro-climatic conditions of sub-mountainous region of Punjab. Therefore, intercropping of sugarcane with Mash during summer season assumes great importance as the system does not require any additional expenditure on inputs except cost of seed. It may help smother the weeds and thus prevent loss of resources. Being a leguminous crop, it will add to fertility of soil and being a short duration crop (75 days) it may not adversely affect productivity of sugarcane and infact may increase overall productivity and income from the system. The present investigation was undertaken to study the effect of intercropping and weed control measures on the weeds and the crops.

Field experiment was conducted under irrigated condition during spring season of 2002 and 2003 at PAU Regional Station, Gurdaspur. The soil of the experiment was sandy loam in texture, neutral in reaction, low in available N, medium in available P and high in available K. A set of 12 treatments comprising the combination of pendimethalin (0.75 kg ha^{-1}), trifluralin (1.0 kg ha^{-1}), two hand weedings (25 and 45 days after planting of sugarcane) and weedy condition with sole sugarcane, one row of Mash in between two rows of sugarcane and two rows of Mash in between two rows of sugarcane spaced 75 cm, was evaluated in randomized block design with three replications (Table 1). Sugarcane cultivar COJ-88 and Mash cultivar UG-218 were sown on March 12 and 18 during both the years, respectively. Trifluralin was incorporated in the soil one day before planting of summer Mash, while pendimethalin was applied next day after sowing of Mash, using flat fan nozzle at spray volume of 500 l water ha^{-1}. The manual hoeings were done 30 and 60 days after planting of sugarcane crop in both the years. Common weeds found in the experiment were *Digitaria sanguinalis, Bracharia repens, Medicago denticulate, Panicum colonum, Chenopodium album, Eleusine aegyptiacum, Euphorbia hirta, Trianthema monogyna* and *Cyperus rotundus*. Grassy, non-grassy weeds and sedges contributed 87.8, 9.1, 2.4 and 86.2, 10.0, 3.7% to total weed population during 2002 and 2003, respectively. *E. aegyptiacum* was the predominant weed which alone represented 38.3 and 34% to total weed population during 2002 and 2003, respectively.

The highest weed control efficiency was recorded under pendimethalin at 0.75 kg ha^{-1} (50%) followed by hand weeding (47.6%) and trifluralin (36.8%) (Table 1). Pendimethalin was more effective than trifluralin against *Bracharia reptans*. Pendimethalin application resulted in highest cane and Mash yield. Cane yield obtained with pendimethalin was 16% higher than in trifluralin and 31.9% higher than the weedy condition. Similarly, pendimethalin also caused 14.3% higher Mash yield than trifluralin due to more suppression of weeds. Higher yield of both the crops under pendimethalin and hand weeding treatments over trifluralin was attributed to increase in girth, number of internodes per plant and number of millable canes. All the weed control treatments also recorded significantly more cane equivalent yield as

Table 1. Effect of different treatments on millable canes, weed dry matter, cane, Mash and cane equivalent yield

Treatment	Millable canes ('000 ha^{-1})		Weed dry matter (g m^{-2}) at 75 DAP		Cane equivalent yield (t ha^{-1})		Cane yield (t ha^{-1})		Mash yield (kg ha^{-1})	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
Intercropping systems										
Sugarcane (Sole crop)	67.9	70.3	61.0	81.1	64.4	57.9	64.4	57.9	-	-
Sugarcane+Mash (1 : 1)	69.7	74.7	49.5	70.0	72.4	66.6	69.1	60.1	270	496
Sugarcane+Mash (1 : 2)	68.7	71.9	32.7	51.0	69.1	62.9	64.9	55.9	343	472
LSD (P=0.05)	NS	NS	12.8	9.0	5.2	5.1	NS	NS	-	-
Weed control treatments										
Weedy	51.9	58.0	74.7	95.0	55.4	54.9	53.7	50.2	195	413
Pendimethalin at 0.75 kg ha^{-1}	76.0	79.2	32.4	52.4	77.2	67.8	73.8	63.3	387	505
Trifluralin at 1.0 kg ha^{-1}	71.4	73.8	49.2	67.2	63.6	61.6	60.8	57.4	308	473
2 HW (25 and 45 DAP)	75.5	78.1	34.5	54.4	78.3	65.8	76.2	61.1	338	547
LSD (P=0.05)	13.9	14.2	14.8	10.7	6.0	5.9	6.0	6.1	-	-

HW–Hand weeding, NS–Not Significant.

compared to weedy condition. The highest cane equivalent yield (72.5 t ha^{-1}) was recorded under pendimethalin which was significantly higher than under trifluralin and weedy condition. However, cane equivalent yield did not differ significantly due to pendimethalin and hand weeding.

Intercropping of sugarcane with one or two rows of Mash caused 15.9 and 41% weed growth suppression as compared to sole sugarcane. Higher weed suppression with two rows of Mash in between two rows of sugarcane as compared to one row of Mash was due to more shade provided by Mash canopy owing to higher density of plants per unit area. Cane yield was not affected due to the intercropping systems. Growing of two rows of Mash in between two rows of sugarcane gave more Mash yield as compared to one row of Mash. One row of Mash in between two rows of sugarcane recorded the highest cane equivalent yield (69.5 t ha^{-1}), which was significantly more by 13.5% than sole sugarcane crop and statistically at par with two rows of Mash in between two rows of sugarcane. Higher cane equivalent yield under both the intercropping systems was due to additional yield of Mash without any adverse effect on sugarcane.

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