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Effect of Row Spacing and Weed Management Practices on Weeds, Growth and Yield of Pigeonpea [*Cajanus cajan* (L.) Millsp.]

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Pigeonpea [*Cajanus cajan* (L.) Millsp.] is an important grain legume crop in India. Due to its wide row spacings (50 cm apart) and initial slow growth, weeds pose a major problem to its productivity (PAU, 2010). Moreover, as it is grown during rainy season where weed growth is luxuriant. For obtaining high yields, weed control is a must using different strategies as weeds can cause upto 80% reduction in grain yield of pigeonpea (Talnikar *et al*., 2008). In pigeonpea, many herbicides which are applied as pre-mergence such as alachlor (Talnikar *et al.*, 2008; Pardeshi *et al.*, 2008), oxidiazon (Singh, 2007), metolachlor (Nagaraju and Kumar, 2009) and pendimethalin (Srivastava and Srivastava, 2004; Singh, 2007; Virkar *et al.*, 2007; Pardeshi *et al.*, 2008; Yadav and Singh, 2009) have been reported to control weeds effectively. However, these herbicides provide effective control of weeds for about initial one month period only. Pigeonpea is a long duration crop and many times weeds appear at the later stages also which need to be controlled manually. Hand weeding though has been found to be very effective in controlling weeds in pigeonpea (Srivastava and Srivastava, 2004; Singh, 2007; Yadav and Singh, 2009; Nagaraju and Kumar, 2009), however, labour is not only very costly but many times it is not available especially during critical crop-weed competition period. There was, therefore, a dire need to see the possibility of mechanical interculture for controlling weeds in pigeonpea. As interculture is not possible in rows 50 cm apart, there was a need to study effect of wider row spacing on the productivity of pigeonpea as well as to study the feasibility for mechanical interculture. Therefore, field experiment was conducted to study the effect of row spacings and weed control treatments on weeds and the growth and yield of pigeonpea.

A field experiment was conducted during **kharif** 2008 at the experimental area of Punjab Agricultural University, Ludhiana on a loamy sand soil under irrigated conditions. The experiment comprised two row spacings (50 and 67.5 cm) and three weed control treatments viz., unweeded control, pre-emergence application of pendimethalin @ 0.75 kg/ha and hand weeding/ interculture twice 25 + 50 days after sowing (DAS). The experiment was conducted in factorial randomized block design with four replications. A seed rate of 15 kg/ ha was used in both the spacings to have uniform plant population per unit area. Pendimethalin was sprayed one day after sowing using 500 litres of water with a knap sack sprayer fitted with flat fan nozzle. In case of hand weeding/interculture treatments, hand weeding was done in 50 cm row spacing plots and interculture was done with a tractor drawn cultivator in case of 67.5 cm row spacing plots at 25 and 50 DAS. The crop was sown on 12 June 2008 using cultivar PAU 881. The plot size was 15 × 2.7 m in case of 67.5 cm row spacing treatments and 15 × 2.0 m in case of 50.0 cm row spacing treatments. All other recommended package of practices were followed to raise the crops successfully (PAU, 2010). Dry matter of weeds was recorded at harvest on whole plot basis. Data on plant growth, yield attributes, biological yield and grain yield were recorded at harvest.

Commelina benghalensis (Koan makki), *Trianthema portulacastrum* (Itsit), *Euphorbia hirta* (Badi dodak), *Digitaria* spp. (Takri ghas), *Dactyloctenium aegyptiacum* (Madhana) and *Cyperus* spp. (Motha) were the major weeds present in the experimental field. Row spacings did not differ significantly in influencing dry matter of weeds (Table 1), though wider row spacing recorded slightly higher weed dry matter possibly due to more space available for the weeds. Pendimethalin 0.75 kg/ha and two hand weedings/interculture treatments recorded significantly lower weed dry matter than unweeded plots. Weed control efficiency was 31.6% and 25.3% in 50 and 67.5 cm row spacings, respectively. Among weed control treatments, pendimethalin provided slightly higher weed control efficiency (50.6%) than two hand weedings/interculture treatments (45.1%).

Row spacings did not differ significantly in influencing the plant growth, yield attributes, biological yield and grain yield of pigeonpea (Table 1). Similar grain yields in both the row spacings could be due to similar plant population in these treatments as the same

Table 1. Effect of row spacings and weed control treatments on weeds, plant characters, yield attributes and yield of pigeonpea

Treatments	Dry matter of weeds (kg/ha)	Plant height (cm)	Primary branches/ plant	Secondary branches/ plant	Pods/ plant	100-seed weight (g)	Seeds/ pod	Biological yield (kg/ha)	Grain yield (kg/ha)
Row spacings (cm)									
50	987	152.3	9.07	4.75	133.1	6.42	4.27	3997	1134
67.5	1078	147.4	9.41	4.67	134.2	6.39	4.22	4405	1191
LSD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS
Weed control treatments									
Pendimethalin 0.75 kg/ha	713	152.0	9.30	4.75	146.3	6.43	4.35	4225	1318
Two hand weedings/Interculture (25 & 50 DAS)	792	149.1	9.30	4.78	139.1	6.45	4.33	4785	1291
Unweeded control	1443	148.4	9.11	4.60	115.5	6.34	4.05	3594	879
LSD (P=0.05)	212	NS	NS	NS	22.2	NS	NS	561	245

NS–Not Significant.

seed rate was used on area basis. Pendimethalin 0.75 kg/ha and hand weeding/interculture produced similar grain yields which were significantly higher than those in unweeded control plot which were due to higher number of pods/plant in these treatments. Pendimethalin 0.75 kg/ha and two hand weedings/ interculture recorded significantly higher biological yield than unweeded control. The uncontrolled weeds caused 33.3 and 31.9% reduction in grain yield of pigeonpea as compared to pendimethalin 0.75 kg/ha and two hand weedings/interculture, respectively. Higher pods/plant, grain yield and biological yield in pendimethalin and hand weeding/interculture treatments could be due to higher weed control efficiency in these treatments. Similar findings were also reported by Srivastava and Srivastava (2004) and Yadav and Singh (2009).

Interaction effect between row spacing and weed control treatments on grain yield of pigeonpea was non-significant, however, the results clearly show (Table 2) that in case of 67.5 cm row spacing, interculture performed 25 and 50 DAS provided the similar grain yield (1295 kg/ha) to that of 50 cm row spacing where two hand weedings were done to control weeds (1287 kg/ha). So, for controlling weeds effectively in pigeonpea, pendimethalin 0.75 kg/ha can be applied as pre-emergence or mechanical interculture can be done at 25 and 50 DAS. In labour scarcity regions, mechanical interculture provides another option for controlling weeds and obtaining higher yields of pigeonpea.

Table 2. Interactive effect of different row spacings and weed control treatments on grain yield (kg/ha) of pigeonpea

Row spacings (cm)	Weed control treatment		
	Pendimethalin 0.75 kg/ha	Two hand weedings/ Interculture (25 & 50 DAS)	Unweeded control
50	1302	1287	814
67.5	1335	1295	944
Mean	1318	1291	879
LSD (P=0.05) : NS			

NS–Not Significant.

REFERENCES

Nagaraju, A. P. and H. K. M. Kumar. 2009. Efficacy of herbicides on weed control in pigeonpea [*Cajanus cajan* (L.) Millsp.]. *Mysore J. agric. Sci.* **43** : 201-204.

Pardeshi, S. S., J. T. Paturde, S. V. Kagne, P. G. Chavan, S. A. Dhale and V. S. Raut. 2008. Effect of weed management practices on weed growth and grain yield of maize+pigeonpea intercropping system. *J.*

Soils Crops **18** : 454-457.

PAU, 2010. *Package of Practices for Crops of Punjab, Kharif 2010.* Punjab Agricultural University, Ludhiana.

Singh, R. S. 2007. Integrated weed management in pigeonpea (*Cajanus cajan*). *Environ. Ecol*. **25S *(Special 3A)*** : 780-782.

Srivastava, G. P. and V. C. Srivastava. 2004. Chemical weed control in pigeonpea (*Cajanus cajan*)+soybean (*Glycine max*) intercropping system. *J. Res. Birsa agric. Univ*. **16** : 91-94.

Talnikar, A. S., G. L. Kadam, D. R. Karande and P. B. Jogdand. 2008. Integrated weed management in pigeonpea [*Cajanus cajan* (L.) Millsp.]. *Int. J. agric. Sci.* **4** : 363-370.

Virkar, K. M., H. M. Patil, A. V. Khairnar and A. G. Wani. 2007. Integrated weed management in pearl millet-pigeonpea intercropping system. *J. Fmg. Sys. Res. Dev.* **13** : 245-247.

Yadav, M. K. and R. S. Singh. 2009. Effect of nitrogen levels and weed management practices on pigeonpea (*Cajanus cajan*) and rice (*Oryza sativa*) intercropping system under ridge-furrow planting system. *Ind. J. agric. Sci*. **79** : 268-272.