RESEARCH COMMUNICATION

EFFECTS OF PHOSPHORUS LEVELS AND WEED MANAGEMENT ON GRAIN YIELD AND PHOSPHORUS CONTENT IN PIGEONPEA AND SOYBEAN INTERCROPPING SYSTEM

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Abstracts: The intercropping systems have opened up new horizons to augment pulse crop productivity per unit area per unit time. In case of pigeonpea the vegetative growth in initial stages is very slow; therefore, the intercrop should be selected in such a way which could complete its grand growth period before attaining the peak growth of pigeonpea. Seeding soybean as intercrop with pigeonpea may serve this requirement (Saraf *et al*., 1975).

Keywords: Pigeonpea, Phosphorus, Soyabean, Weed

INTRODUCTION

Phosphorus is an essential plant nutrient and its importance in improving the crop production is well recognised from time immemorial. It enhances profused root growth, controls photosynthesis and breakdown of carbohydrates and transfer of energy within the plants. On the other hand, phosphorus stimulates pod setting, hastens maturity and provides extensive and vigrous root system (Dwivedi & Bapat,1996).

Intercropping can be a potential biological tool to manage weeds, yet the system by itself would not be able to provide an acceptable and satisfactory level of weed control, especially during early stage of crop growth because the crop canopy is inadequate to stress weed growth. Further, control of weeds through cultural or mechanical methods may often be difficult owing to narrow inter-row spacing. Therefore, there is a need to develop an alternate system.

Therefore, efforts are needed to workout suitable levels of phosphorus and weed management practices for pigeonpea + soybean intercropping system. Keeping these points in view, the present experiment entitled "Effect of phosphorus levels and weed management on grain yield and phosphorus content in pigeonpea + soybean intercropping system" was carried out during two consecutive years from 2008-09 to 2009-10.

Objectives

1. To study the effect of phosphorus levels and weed management on yield and phosphorus concentration of pigeonpea in pigeonpea + soybean intercropping system
2. To study the effect of phosphorus levels and weed management on yield and phosphorus concentration of soybean in pigeonpea + soybean intercropping system

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METHODOLOGY

Field experiments were conducted for two consecutive years during 2008-09 and 2009-10 to study the effect of phosphorus levels and weed management on yield and quality of pigeonpea + soybean intercropping system at the Raj Mohini Devi College of Agriculture and Research Station, Ajirma Farm, IGKV, Ambikapur (C.G.). The soil of the experimental field was red and yellow classified as *Inceptisols* and texturally recognized as sandy-loam, which constitute upland bunded farming situation. The soil of experimental site was low in nitrogen (198.2 kg ha^{-1}), phosphorus (8.4 kg ha^{-1}) and medium in potassium (282.2 kg ha^{-1}) content. The soil was slightly acidic in reaction (5.7 pH). The experiment was laid out in split plot design comprising 4 phosphorus levels i.e. P_0 = 0, P_1 = 25, P_2 = 50 and P_3 = 75 P_2O_5 kg ha^{-1} as main-plot treatments and 6 weed management practices i.e. W_1 = Weedy check (unweeded control), W_2 = Hand weeding (once) 20 DAS, W_3 =Hand weeding (twice) 20 & 40 DAS, W_4 = Chlorimuron ethyl (8 g ai/ha) as post emergence, W_5= Fenoxaprop- ethyl (80g ai/ha) as post emergence and W_6 = Metribuzine (350g ai/ha) as pre emergence as sub-plots treatments with three replications.

RESULT

The findings of two years revealed that the grain yield and phosphorus content in grain of pigeonpea and soybean in intercropping system was significantly influenced by phosphorus levels. Application of 75 kg P_2O_5 ha^{-1} registered significantly higher grain yield of pigeonpea and soybean as well as phosphorus content in their grain as compared to rest of the treatments, however it was at par with 50 kg P_2O_5 ha^{-1} during both the years. Similar findings have been also reported by Prasad *et al.(*2001).

As regard to weed management practices, significantly higher grain yield of pigeonpea and

soybean phosphorus content in their grain were recorded under hand weeding (twice) 20 and 40 DAS as compared to rest of the weed management treatments, however, application of metribuzine @ 350 g ha^{-1} as pre-emergence showed the statistically similar result during both the years. Similar findings have been reported by Jain and Tiwari (1992) and Prasad *et al. (*2001).

Table 1. Grain yield and phosphorus content in pigeonpea and soybean as influenced by phosphorus levels and weed management in pigeonpea + soybean inter cropping system

Treatment	Pigeonpea				Soybean			
	Grain yield (q ha^{-1})		Phosphorus content (%) in grain)		Grain yield (q ha^{-1})		Phosphorus content (%) in grain	
	2008-09	2009-10	2008-09	2009-10	2008-09	2009-10	2008-09	2009-10
Phosphorus levels (kg ha^{-1})								
P_0=0	12.39	11.58	0.340	0.334	8.87	8.48	0.68	0.66
P_1=25	14.03	13.49	0.363	0.365	10.69	10.35	0.71	0.69
P_2=50	15.04	14.34	0.384	0.374	12.11	11.25	0.73	0.71
P_3=75	15.89	15.47	0.398	0.388	12.33	11.53	0.75	0.73
SEm±	0.37	0.34	0.006	0.007	0.13	0.10	0.004	0.004
CD (P=0.05)	1.28	1.16	0.020	0.022	0.44	0.33	0.015	0.015
Weed Management								
W_1 = Weedy check (unweeded control)	6.96	6.54	0.345	0.330	7.79	7.15	0.62	0.60
W_2 = Hand weeding (once) 20 DAS	14.16	13.43	0.363	0.353	10.29	9.87	0.70	0.68
W_3 = Hand weeding (twice) 20 & 40 DAS	17.38	16.70	0.405	0.395	13.28	12.55	0.77	0.74
W_4 = Chlorimuiron ethyl (8 g ai/ha) as post emergence	15.20	14.52	0.371	0.363	10.77	10.20	0.72	0.70
W_5= Fenoxaprop ethyl (80 g ai/ha) as post emergence	15.41	14.82	0.372	0.365	10.93	10.49	0.72	071
W_6= Metribuzine (350 g ai/ha) as pre emergence	16.92	16.30	0.387	0.381	12.93	12.16	0.76	0.73
SEm±	0.51	0.49	0.006	0.008	0.26	0.25	0.006	0.007
CD (P=0.05)	1.47	1.41	0.020	0.024	0.75	0.71	0.016	0.019

CONCLUSION

In pigeonpea and soybean inter cropping system, use of 75 kg P_2O_5 ha^{-1} and hand weeding twice at 20 and 40 DAS gave significantly highest grain than others, however it was comparable to 50 kg P_2O_5 ha^{-1} and Metribuzine @ 350 g ai ha^{-1} as pre emergence, respectively.

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