

Research Notes

Fertilizer economy through phospho-compost for sequence cropping

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Phospho-compost is a compost prepared by addition of low grade rock phosphate and phosphate solubilizing micro-organisms with organic wastes. Rock phosphate, as a cheaper source of P, has attracted the attention of the scientists (Misra and Panda, 1969). In the process of decomposition many organic acids are liberated. Due to this acidic condition, phosphorus from rock phosphate applied in the compost gets solubilized and compost becomes enriched. Phospho-compost application increased the phosphorus use efficiency of greengram (12.90%) and wheat (20.48%) over single super phosphate (Mishra *et al.* 1982). In order to study the effect of phospho-compost on *kharif* greengram and its residual effect on *rabi* sorghum the present experiment was conducted.

The experiment was laid out in randomized block design with five treatments in four replications during 2000-2001 at Agricultural Research Station, Chas, Maharashtra (India). The gross and net plot size was 4.20 x 3.60 m and 3.60 x 2.70 m, respectively. The spacing adopted was 30x10 cm for greengram and 45x15 cm for *rabi* sorghum.

Phospho-compost was applied on the basis of total P_2O_5 content (5.0 per cent) and nitrogen (1.15 per cent) as per treatments to *kharif* greengram and only nitrogenous fertilizer was applied to *rabi* sorghum. The phosphorus through

single superphosphate was applied to treatment one only for *kharif* and *rabi* crops. The soil was medium black with available N (108 kg ha^{-1}), P (28.44 kg ha^{-1}), K (480 kg ha^{-1}) and slightly alkaline in reaction (pH 8.27). The recommended dose of fertilizer viz. 25 kg N and 50 kg P_2O_5 ha^{-1} for greengram and 60 kg N + 30 kg P_2O_5 ha^{-1} for *rabi* sorghum was applied. The *kharif* crop was sown on June 14, 2000 and harvested on August 30, 2000; whereas *rabi* sorghum was sown on September 25, 2000 and harvested on February 7, 2001. Experimental plot was kept weed free by hoeing and hand weeding during both the seasons.

Kharif greengram

The data presented in table 1 indicated that the growth contributing characters including grain and fodder yield of greengram was significantly influenced by different treatments and application of phospho-compost. Application of RDN alone being comparable with RDN + PC as well as RDF, recorded higher plant height over 50% RDN + PC and 75% RDN + PC. The highest number of pods per plant was recorded when RDN with phospho-compost was applied.

The significantly higher grain yield (1409 kg ha^{-1}) of greengram was obtained from the treatment RDN + PC over application of RDN

Treatment No.	<i>Kharif</i>	<i>Rabi</i>
1.	Recommended dose of fertilizers	Recommended dose of fertilizers
2.	100% N alone	100% N alone
3.	100% N + Phospho-compost to provide P_2O_5	100% N alone
4.	75% N + Phospho-compost to provide P_2O_5	100% N alone
5.	50% N + Phospho-compost to provide P_2O_5	100% N alone

Table 1. Effect of phosphocompost on growth contributing characters and yield of greengram and its residual effect on *rabi* sorghum

Treatment to <i>kharif</i> greengram	Greengram				Treatment to <i>Rabi</i> sorghum	Sorghum			
	Plant height (cm)	No. of pods plant ⁻¹	Yield kg ha ⁻¹			Plant height (cm)	Test weight (g)	Yield kg ha ⁻¹	
			Grain	Bhusa				Grain	Fodder
RDF	39.6	13	1370	2407	RDF	171.0	19.8	931	7822
RDN alone	41.3	12	1274	2294	100% N alone	158.5	20.7	813	7385
RDN + PC	41.0	14	1409	2449	100% N alone	173.5	21.3	1001	8131
75% RDN + PC	38.9	13	1358	2366	100% N alone	166.5	19.7	914	6613
50% RDN + PC	38.0	11	1312	2171	100% N alone	161.8	18.7	754	6616
SE ±	0.63	0.52	0.41	0.94		0.78	0.68	0.53	2.41
CD (P=0.05)	1.94	1.60	126.0	289		2.40	2.09	163	742

alone; however it was on par with 75% RDN + PC and 50% RDN + PC and RDF. The significantly higher grain yield of greengram obtained from treatment of phospho-compost was also reported by Raundal *et al.* (1999).

Rabi sorghum : Effect of kharif treatments

The effect of *kharif* treatments on *rabi* sorghum in respect of plant height, test weight, grain and fodder yield was found to be significant. The treatments given in *kharif* season *i.e.* application of RDN + PC favourably influenced and clearly exhibited their residual effect on *rabi* sorghum. Application of RDN + PC in *kharif* season and its residual effect on sorghum crop in *rabi* season significantly and favourably increased the plant height by 1.44 per cent, test weight by 7.04 per cent over RDF. Raundal *et al.* (1999) also reported that application of phospho-compost to *kharif* crops exhibited the residual effect on *rabi* crops in respect of plant height and test weight.

The yield data of sorghum revealed that the application of RDN through urea during *rabi* season and phosphorus through phospho-compost for *kharif* crops increased the grain and fodder yields of *rabi* sorghum significantly

over the application of recommended dose of nitrogen through urea alone and 50 per cent RDN + PC for *kharif* crop.

The maximum grain (1001 kg ha⁻¹) and fodder (8131 kg ha⁻¹) yield were recorded due to RDN + PC which were 19 and 8.16 per cent more respectively over RDN alone. The grain and dry matter yield due to RDN + PC recorded more yields over RDF. The results are confirmation with Rasal *et al.* (1996).

The results clearly indicated that the application of nitrogen through urea with phospho-compost applied in *kharif* season enhanced the growth of *kharif* and *rabi* crops resulting in an increase in grain and fodder yield. This may be due to the application of phospho-compost in *kharif* which would have solubilized more phosphorus from phosphate rock by evolving more organic acids and meets the P needs of the *rabi* crop. Mathur *et al.* (1980), Bhanavase *et al.* (1994) and Rasal *et al.* (1996) also reported similar effects of phospho-compost.

It can be inferred from the above results that the application of phosphorus through phospho-

compost not only fulfilled the phosphorus requirement of greengram but it also met the phosphorus requirement of succeeding rabi sorghum. Therefore, it is possible to supply the phosphorus through phospho compost once in kharif to fulfil the phosphorus requirements of both the crops in sequence under dryland conditions.

References

- Bhanavase, D.B., Rasal, P.H., Jadhav, B.R. and Patil, P.L. (1994). Mineralization of nutrients during production of phospho-compost. *J. Indian Soc. Soil Sci.* 42: 145-147.
- Mathur, B.S., Sarkar, A.K. and Mishra, B. (1980). A study on rock-phosphate changed compost. *J. Indian Soc. Soil Sci.* 28: 206.
- Mishra, M.M., Kapoor, K.K. and Yadav, K.S. (1982). Effect of compost enriched with mussoorie

rock phosphate on crop yield. *Indian J. Agric. Sci.* 52: 674.

- Misra, U.K. and Panda (1969). Utilization of rock phosphate as phosphate source. *Indian J. Agric. Sci.* 39: 353.
- Rasal, P.H., Jadhav, B.R., Kalbhor, H.B., Bhanavase, D.B., Konde, B.K. and Patil, P.L. (1996). A study on production and evaluation phosphocompost on yield of soybean and sorghum. *J. Maharashtra Agric. Univ.* 21: 361-364.
- Raundal, P.U., Sabale, R.N. and Dalvi, M.D. (1999). Effect of phospho-manures on crop yield in greengram-wheat cropping system. *J. Maharashtra Agric. Univ.* 24: 151-154.

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Research Notes

Identification of efficient cropping zone for sugarcane in Tamil Nadu

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Sugarcane is the main source of sugar (90%) in India and holds a prominent position as a cash crop. India has the largest area under sugarcane in the world and also has neck-neck race with Brazil in case of production. Sugar industry is the second largest agro-based industry in India. In Tamil Nadu, sugarcane is being cultivated in almost all districts. On productivity (production ha⁻¹) basis Tamil Nadu ranks first in India. Though sugarcane is being cultivated widely in Tamil Nadu, the yields are varying much due to the variation of climate

and edaphic factor. So there is a need to identify the efficient cropping zone (ECZ) for increasing the productivity and area under sugarcane.

A study was carried out at Tamil Nadu Agricultural University, Coimbatore during 2001 to identify the ECZ for sugarcane in Tamil Nadu. The district and state data related to area, production and productivity of sugarcane and data on total cultivable area were collected for five years (1991-92, 1992-93, 1993-94, 1994-95 and 1995-96) from Agrostat (1996).

Table 1. Criteria for ECZ

Efficiency category	RYI	RSI	Cropping zone
1	125 (High)	100 (High)	Most ECZ
2	125 (High)	<75 (Low)	ECZ
3	<75 (Low)	100 (High)	Not ECZ
4	<75 (Low)	< 75 (Low)	Not ECZ