Effect of plant density and organic nutrient management practices on productivity, nutrient content and uptake of Finger Millet and their residual effect on Green Pea.

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Abstract

An experiment was conducted at Birsa Agricultural University, Ranchi during 2017-18 and 2018-19 for Finger millet-Green pea cropping system under two factors viz., different seed rates and organic nutrient managements for finger millet and its residual effect with 50% nutrition in succeeding green pea. Results revealed that N, P, K, Fe and Ca content in grain and straw, N, P and K uptake in grain and straw, total N, P and K uptake and yield of finger millet and green pea were influenced by different treatments of seed rate and organic nutrient management. In grain of finger millet, N (1.40%), P (0.416%), K (0.364%), Fe (4.89 mg/100g grain) and Ca (351.60 mg/100g grain) were maximum with 125% seed rate and 50% N through FYM + 50% N through vermicompost. In straw of finger millet N (0.173%), P (0.080%) and K (1.138%) were maximum with 125% seed rate and 50% N through FYM + 50% N through vermicompost. N, P and K uptake in grain (29.27 kg N/ha, 1.95 kg P/ha & 8.15 kg K/ha) as well as straw (7.31 kg N/ha, 14.55 kg P/ha & 53.51 kg K/ha) and total uptake (36.57 kg N/ha, 16.49 kg P/ha & 61.52 kg K/ha) were maximum with 125% seed rate and 50% N through FYM + 50% N through vermicompost. Yield of finger millet (25.1 q/ha) and green pea (94.4 q/ha) were also recorded maximum in the same treatment.

Key words: seed rate, organic nutrient management, finger millet, residual effect.

Finger millet, commonly known as *ragi*, is grown extensively in various regions of India. It is used as staple food that supplies a major portion of calories and protein for people of low-income group. Finger millet is generally taken in uplands in Jharkhand where they perform poorly due to low soil fertility as well as poor plant stand under direct sowing conditions. In recent decades, emphasis has been shifted from individual crop to cropping system because responses in component crops are influenced by the nutrient application to preceding crops by leaving substantial effect on the succeeding crop as carry over benefit. Also, taking two crops in a sequence, or intensive cropping in place of mono-cropping in uplands, like inclusion of pulses in crop sequence is agronomically very significant. Pea (*Pisum sativum L.*) is a good predecessor to other crop as it enriches the soil with the nodule bacteria which leave in its roots and fix nitrogen in soil which becomes available to next plant (Rudnicki and Wenda 2002). Moreover, pea has a higher capacity to utilize minerals (inorganic compounds) which are difficult to assimilate and therefore practically not available for cereals (Adgo and Schulze 2002). The root system of pea penetrates to a depth of 1-1.5 m and as a result, unlike grain crops, pea can extract nutrients from the deeper soil layers (Vocanson *et. al.* 2006). It has been suggested that there is no need to apply fertilizers if moderate nutrient requiring crops like pea succeeds. Deleterious effect of chemical fertilizers in agriculture has led to adopt organic crop production as an alternative method which also maintains soil health and improves overall ecological balance of the production system. Thus, adopting combination of proper plant population and organic nutrient management can lead in better grain production.

Information on seed rate in finger millet under organic nutrient management and its residual effect on second crop in sequence is very meager.

Materials and Methods

A field experiment was undertaken at Agronomy Research Fram, Birsa Agricultural University at Kanke, Ranchi during 2017-18 and 2018-19. The soil of the experimental site was acidic in reaction (pH 5.8), sandy loam in texture, low in organic carbon (0.37%), available nitrogen (250 kg/ha), available phosphorous (17.9 kg/ha) and available potassium (105.1 kg/ha). The experiment was laid out in randomized block design (Factorial) with three replications. There seed rates viz., 100%, 125% and 150% along with different organic nutrient managements viz., control, 100% N through FYM, 100% N through vermicompost, 75% N through FYM + 25% N through vermicompost, 50% N through FYM + 50% N through vermicompost and 25% N through FYM + 75% N through vermicompost. Altogether the experiment comprised of eighteen treatments. The nutrients as per the treatments were applied in the soil at the time of sowing. Finger millet was direct sown in the month of June with row to row spacing of 30 cm. Yield attributes as well as contents of grain and straw were recorded at maturity and after harvest. Finger millet was harvested in the month of November, after harvesting, the straw was incorporated into the soil with the help of power tiller. The pea was sown at spacing of 30 cm x 10 cm and was provided with only 50% N of RDF through vermicompost. Yield of green pea pods were recorded at maturity and after harvesting. Green pea pods were harvested for vegetable purpose thrice in the month of February.

The oven dried and then grounded grain sample was analyzed for N-content in grain by Kjeldahl method of digestion and distillation as outlined by Jackson (1973) and described by Tondon (1999). Nitrogen content of grain was multiplied with grain yield for obtaining N-uptake (kg/ha) by grain. Grounded grain sample was digested in di-acid mixture (HNO_3: $HClO_4$ in 10:4 ratio on volume basis. The phosphorus content in extractant was determined calorimetrically by using 440 nm filter following vanadomolybdate nitric acid yellow colour method (Jackson, 1973). Then the phosphorus content of grain was multiplied with grain yield for obtaining P-uptake (kg/ha) by grain. Potassium content in grain was determined by flame photometer from the same extractant used for phosphorus as described by Jackson (1973). Then the potassium content of the grain was multiplied with grain yield for obtaining K-uptake (kg/ha) by grain. Like grain, the grounded straw samples was also analyzed for N-content by Kjeldahl method of digestion and distillation as outlined by Jackson (1973) and described by Tondon (1999). Nitrogen content of straw was multiplied with straw yield for obtaining N-uptake (kg/ha) by straw. Similar to grain, grounded straw sample was digested in diacid mixture (HNO_3: $HClO_4$ in 10:4 ratios on volume basis. The phosphorus content in extractant was determined calorimetrically by using 440 nm filter following vanadomolybdate nitric acid yellow colour method (Jackson, 1973). Then the phosphorus content of straw was multiplied with straw yield for obtaining P-uptake (kg/ha) by straw. Potassium content in straw was determined by flame photometer from the same extractant used for phosphorus as described by Jackson (1973). Then the potassium content of the straw was multiplied with straw yield for obtaining K-uptake (kg/ha) by straw.

Results and Discussion

Nitrogen content (%) in grain and straw of finger millet was recorded (Table 4.21) significantly maximum (1.31% & 0.175%) with 125% seed rate than 150% & 100% seed rates (1.19 % & 1.17% and 0.156% & 0.154%, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient managements and recorded maximum nitrogen content (1.29% & 0.173%). Interaction in case of grain showed that 125% seed rate with 50% N through FYM + 50% N through vermicompost resulted significant maximum nitrogen content (1.40 %) being *at par* with 125% seed rate along with 25% N through FYM + 75% N through vermicompost (1.37%).

Phosphorus content (%) in grain and straw of finger millet was recorded (Table 4.22) maximum (0.415% & 0.078%) with 125% seed rate than 150% & 100% seed rates (0.386% & 0.375% and 0.066% & 0.065%,

respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be better than other nutrient managements and yielded maximum phosphorus content in grain of finger millet (0.416% & 0.080%) followed by 25% N through FYM + 75% N through vermicompost. Interaction between seed rate and organic nutrient management was observed to be non significant.

Potassium content (%) in grain of finger millet was recorded (Table 4.23) maximum (0.358% & 1.120%) with 125% seed rate than 150% & 100% seed rates (0.341% & 0.332% and 1.048% & 0.985%, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient managements and yielded maximum potassium content in grain of finger millet (0.364% & 1.138%). Interaction between seed rate and organic nutrient management was observed to be non significant.

Iron content (mg/100g grain) in grain of finger millet was recorded (Table 4.24) maximum (4.78 mg/100 g grain) with 125% seed rate than 150% & 100% seed rates (4.69 & 4.45 mg/100 g grain, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient managements and yielded maximum iron content in grain (4.89 mg/100 g grain). Interaction between seed rate and organic nutrient management was observed to be non significant.

Calcium content (mg/100 g grain) in grain of finger millet was recorded (Table 4.25) significantly maximum (313.66 mg/100g grain) with 125% seed rate than 150% & 100 % seed rates (294.20 & 294.04 mg/100 g grain, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient managements and recorded maximum calcium content in grain (339.43 mg/100 g grain). Interaction between seed rate and organic nutrient management showed that 125% seed rate with 50% N through FYM + 50% N through vermicompost showed significant maximum calcium content 351.60 mg/100 g grain than control and was *at par* with all treatments.

Nitrogen uptake (kg/ha) by grains and straw of finger millet was recorded (Table 4.29) maximum (27.11 and 5.58 kg/ha) with 125% seed rate than 150% & 100% seed rates (26.01 & 25.98 and 4.79 & 4.07 kg/ha, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient doses and yielded maximum nitrogen uptake by grains (29.27 & 7.31 kg/ha). Interaction between seed rate and organic nutrient management was observed to be non significant.

Phosphorus uptake (P_2O_5 kg/ha) by grains of finger millet was recorded (Table 4.30) maximum (1.74 & 12.64 kg/ha) with 125% seed rate than 150% & 100% seed rates (1.66 & 1.56 and 11.62 & 9.41 kg/ha, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient doses and yielded maximum phosphorus uptake by grains (1.95 & 14.55 kg/ha). Interaction between seed rate and organic nutrient management was observed to be non significant.

Potassium uptake (K_2O kg/ha) by grains of finger millet was recorded (Table 4.31) significantly maximum (7.52 % 51.36 kg/ha) with 125% seed rate than 150% & 100% seed rates (7.34 & 7.10 and 50.11 & 49.30 kg/ha, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient doses and yielded maximum potassium uptake by grains (8.01 & 53.51 kg/ha). Interaction between seed rate and organic nutrient management in case of grain showed that 125% seed rate with 50% N through FYM + 50% N through vermicompost resulted significant maximum potassium uptake by grains of finger millet 8.15 kg/ha than control and was *at par* with all treatments.

Total N uptake (kg/ha) of finger millet was recorded (Table 4.35) maximum (32.68 kg/ha) with 125% seed rate than 150% & 100% seed rates (30.8 & 29.04 kg/ha, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient managements and showed maximum uptake (36.57 kg/ha). Interaction between seed rate and organic nutrient management was observed to be non significant.

Total P uptake (P_2O_5 kg/ha) of finger millet was recorded (Table 4.36) maximum (14.37 kg/ha) with 125% seed rate than 150% & 100% seed rates (13.27 & 10.97 kg/ha, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient managements and showed maximum uptake (16.49 kg/ha). Interaction between seed rate and organic nutrient management was observed to be non significant.

Total K uptake (K_2Okg/ha) of finger millet was recorded (Table 4.37) maximum (58.89 kg/ha) with 125% seed rate than 150% & 100% seed rates (57.44 & 56.39 kg/ha, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient managements and showed maximum uptake (61.52 kg/ha). Interaction between seed rate and organic nutrient management was observed to be non significant.

Grain yield (q/ha) of finger millet (Table 4.19) was recorded significantly maximum (20.4 q/ha) with 125% than with 150% & 100% seed rates (19.4 & 18.8 q/ha, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient managements and produced maximum grain yield (24.0 q/ha). Interaction showed that 125% seed rate with 50% N through FYM + 50% N through vermicompost yielded significantly maximum grain yield 25.1 q/ha being *at par* with 125% seed rate along with 25% N through FYM + 75% N through vermicompost (24.8 q/ha) and 125% seed rate along with 100% N through vermicompost (24.3 q/ha).

Green pod yield (Table 4.43) was recorded significantly maximum (89.1 q/ha) with 125% seed rate than pod length with 100% & 150% seed rates (84.3 & 83.9 q/ha, respectively). In case of organic nutrient management, 50% N through FYM + 50% N through vermicompost was found to be significantly better than other nutrient managements and yielded maximum pod yield (93.1 q/ha).

Interaction between seed rate and organic nutrient management showed that 125% seed rate with 50% N through FYM + 50% N through vermicompost resulted significant maximum pod yield (94.4 q/ha) being *at par* with all treatment combinations except control.

Balanced combination of organic sources is indispensible to supplement nutrients in accordance with the demand of plants for ensuring higher production and productivity without having deleterious effect on soil health. Organic nutrient management showed its influence on grain and straw yield of finger millet. This might be because of increased as well as sustained supply, absorption and assimilation of nutrients. Supply of nitrogen and other nutrients at right time and quantity enable the plants to assimilate sufficient photosynthetic products and thus increased yield attributes and yield of the crop. Organic manures besides supplying of nutrients, also bring an improvement towards physical properties of soil and thereby improving nutrient and water holding capacity (Bhardwaj and Gaur, 1985). Increased grain yield can also be result of the effect of adequate availability of nitrogen, phosphorus and potassium in soil solution to accelerate root growth and more uptake of nutrients. Higher yield due to combined application of organic manures might be attributed to sustained nutrient supply and also as a result of better utilization of applied nutrients through improved micro – environmental conditions, especially the activities of soil micro – organisms involved in nutrient transformation and fixation. Adequate availability of nutrients in soil solution is essential for proper growth and development of plants and ultimately for yield. Different nutrient managements influenced significantly N, P & K uptake by finger millet. It is to note the fact that the trend of nutrient uptake was same as dry matter accumulation/m^2. The enhanced uptake nutrients (N, P & K) could be due to increased and sustained availability of nutrients through organic manure combinations as compared to alone (FYM or vermicompost) application. Also because of the result of improved physical, chemical and biological properties of soil due to of the application of organic manures. Similar results were found by Gaud (2004) and Dhanushkodi and Kannathasan (2012).

Conclusion

On the basis of above results it may be concluded that application of 125% seed rate with 50% N through FYM + 50% N through vermicompost in *kharif* finger millet and then in *rabi* green pea fed at 50% N through vermicompost may be practiced under finger millet – green pea cropping sequence for higher productivity and profitability.

References

Adgo, E., Schulze, J. 2002. Nitrogen fixation and assimilation efficiency in Ethiopian and German Pea varieties. *Plant and Soil.* 239: 291-299.

Bhardwaj, K.R., Gaur, A.C. 1985. Recycling of organic wastes. ICAR Publication. New Delhi.

Das, T.K., Bandopadhyay, K.K., Bhattacharya, R., Sudishri, S., Sharma, A.R., Behera, U.K., Saharawat, Y.S., Sahoo. P.K., Pathak. H., Vyas. A.K., Dhar, L.M., Gupta, H.S., Gupta, R.K., Jat, M.L. 2016. Effects of conservation agriculture on crop productivity and water use efficiency under an irrigated pigeon pea-wheat cropping system in the western Indo-Gangetic plains. *Journal of Agricultural Science.* 154: 1327-1342.

Dhanushkodi, V., Kannasthan, M. 2012. Importance of industrial waste in maximizing the yield of rice and its effect of soil fertility in coastal region. *International Journal of Research in Chemistry and Environment.* 2**(3)**: 21-25.

Gaud, V.V. 2004. Production potential and econmic feasiblity of rice based cropping system under INM. Ph.D. Thesis submitted to Navsari Agricultural University, Navsari.

Hasan, M.K., Islam, A.K.M.A., Ahmed, J.U., Miyan, M.A.K. 2004. Combining ability for yield related characters in pea. *Journal of the Asiatic Society of Bangladesh.* 30**(2):** 55-62.

Jackson, N.L. 1973. Soil chemical analysis. Prentice Hall of India Pvt. Ltd. New Delhi.

Rudnicki, F., Wenda, P.A. 2002. Usefulness of pea cultivars for mixtures with spring cereals cultivated on wheat soil complex. *Biuletyn Instytutu Hodowli-i-Aklimatyzaiji Roslin.* 221: 199-206.

Tondon, H.L.S. 1999. Method of analysis of soils, water, plants and fertilizer. Fertilizer development and consultation organization, New Delhi, India pp: 144.

Virdia, H.M., Mehta, H.D., Patel, A.P., Patel, M.C. 2008. Productivity and profitability of summer groundnut on heavy black kyari land of South Gujarat. *Asian Journal of Soil Science.* 6**(1):** 101-104.

Vocanson, A., Roger, J., Boizard, H., Marie, H.J. 2006. Effects of soil structure on pea root development according to sowing date and cultivar. *Plant and Soil.* 281: 121-135.

Table-1: Nitrogen content in grain (%) of finger millet as influenced by plant density and organic nutrient management in finger millet - green pea cropping system (pooled data of 2 years).

Seed rate (A)	Organic Nutrient Management (B)						
	Control	100% N FYM	100% N Vermi-compost	75% N FYM + 25% N VC	50% N FYM + 50% N VC	25% N FYM + 75% N VC	Mean
100%	1.13	1.14	1.17	1.15	1.23	1.20	1.17
125%	1.13	1.30	1.36	1.32	1.40	1.37	1.31
150%	1.13	1.14	1.23	1.16	1.26	1.23	1.19
Mean	1.13	1.20	1.25	1.21	1.29	1.27	
Seed Rate	SEm±	**0.01**	CD(P=0.05)	**0.02**			
Organic Nutrient Management	SEm±	**0.01**	CD(P=0.05)	**0.03**			
Interaction (A x B)	**SEm±**	**0.02**	**CD(P=0.05)**	**0.06**	**CV%**	**6.02**	

Table-2: Phosphorous and Potassium content (%) in grain of finger millet as influenced by plant density and organic nutrient management in finger millet - green pea cropping system (pooled data of 2 years).

Treatment	P	K
A. Seed rate		
100%	0.375	0.332
125%	0.415	0.358
150%	0.386	0.341
SEm±	0.003	0.002
CD (P=0.05)	0.008	0.004
B. Organic Manure levels		
Control	0.317	0.297
100% N through FYM	0.396	0.343
100% N through Vermi-compost	0.404	0.353
75% N FYM + 25% N Vermi-compost	0.408	0.348
50% N FYM + 50% N Vermi-compost	0.416	0.364
25% N FYM + 75% N Vermi-compost	0.412	0.356
SEm±	0.004	0.003
CD (P=0.05)	0.011	0.006
Interaction (A x B)	NS	NS
CV%	7.44	8.26

Table-3: Iron content in Finger millet (mg/100 g grain) as influenced by effect of plant density and organic nutrient management in finger millet - green pea cropping system (pooled data of 2 years).

Treatment	Pooled (2 years)
A. Seed rate	
100%	4.45
125%	4.78
150%	4.69
SEm±	0.08
CD (P=0.05)	0.18
B. Organic Manure levels	
Control	4.05
100% N through FYM	4.63
100% N through Vermi-compost	4.67
75% N FYM + 25% N Vermi-compost	4.64
50% N FYM + 50% N Vermi-compost	4.89
25% N FYM + 75% N Vermi-compost	4.76
SEm±	0.11
CD (P=0.05)	0.26
Interaction (A x B)	NS
CV%	7.02

Table-4: Calcium content in Finger millet (mg/100g grain) as influenced by effect of plant density and organic nutrient management in finger millet - green pea cropping system (pooled data of 2 years).

Seed rate (A)	Organic Nutrient Management (B)						
	Control	100% N FYM	100% N Vermi-compost	75% N FYM + 25% N VC	50% N FYM + 50% N VC	25% N FYM + 75% N VC	Mean
100%	155.83	310.33	333.30	313.00	321.10	330.70	294.04
125%	176.53	331.00	339.00	335.10	351.60	348.70	313.66
150%	140.00	310.27	322.33	323.20	330.50	338.90	294.20
Mean	157.46	317.20	335.54	323.77	339.43	338.40	
Seed Rate	SEm±	4.46	**CD(P=0.05)**	NS			
Organic Nutrient Management	SEm±	6.31	**CD(P=0.05)**	15.07			
Interaction (A x B)	**SEm±**	**10.92**	**CD(P=0.05)**	**26.10**	**CV%**	6.26	

Table-5: (N %, P% & K%) in straw of finger millet as influenced by plant density and organic nutrient management in finger millet - green pea cropping system (pooled data of 2 years)

Treatment	N	P	K
A. Seed rate			
100%	0.154	0.065	0.99
125%	0.175	0.078	1.12
150%	0.156	0.066	1.05
SEm±	0.001	0.001	0.01
CD (P=0.05)	0.002	0.003	0.02
B. Organic Manure levels			
Control	0.120	0.039	0.78
100% N through FYM	0.167	0.072	1.06
100% N through Vermi-compost	0.170	0.074	1.11
75% N FYM + 25% N Vermi-compost	0.169	0.076	1.09
50% N FYM + 50% N Vermi-compost	0.173	0.080	1.14
25% N FYM + 75% N Vermi-compost	0.172	0.078	1.12
SEm±	0.001	0.002	0.01
CD (P=0.05)	0.003	0.004	0.02
Interaction (A x B)	NS	NS	NS
CV%	9.18	6.61	9.01

Table-6: N and P uptake (kg/ha) by grains of finger millet as influenced by plant density and organic nutrient management in finger millet - green pea cropping system (pooled data of 2 years).

Treatment	N	P
A. Seed rate		
100%	24.98	1.56
125%	27.11	1.74
150%	26.01	1.66
SEm±	0.68	0.06
CD (P=0.05)	1.62	0.14
B. Organic Manure levels		
Control	18.66	1.12
100% N through FYM	25.37	1.59
100% N through Vermi-compost	27.81	1.74
75% N FYM + 25% N Vermi-compost	26.57	1.67
50% N FYM + 50% N Vermi-compost	29.27	1.95
25% N FYM + 75% N Vermi-compost	28.50	1.86
SEm±	0.96	0.08
CD (P=0.05)	2.29	0.20
Interaction (A x B)	NS	NS
CV%	11.06	12.01

Table-7: K uptake (K_2O kg/ha) by grains of finger millet as influenced by plant density and organic nutrient management in finger millet - green pea cropping system (pooled data of 2 years).

Seed rate (A)	Organic Nutrient Management (B)						
	Control	**100% N FYM**	**100% N Vermi-compost**	**75% N FYM + 25% N VC**	**50% N FYM + 50% N VC**	**25% N FYM + 75% N VC**	**Mean**
100%	4.97	7.03	7.77	7.41	7.74	7.67	7.10
125%	5.41	7.51	8.01	7.85	8.15	8.02	7.52
150%	5.14	7.35	8.00	7.55	8.03	7.88	7.34
Mean	5.17	7.30	7.60	7.60	7.97	7.86	7.32
Seed Rate	SEm±	**0.15**	**CD(P=0.05)**	**0.35**			
Organic Nutrient Management	SEm±	**0.21**	**CD(P=0.05)**	**NS**			
Interaction (A x B)	**SEm±**	**0.36**	**CD(P=0.05)**	**0.85**	**CV%**	8.45	

Table-8: N, P & K uptake (kg/ha) by straw of finger millet as influenced by plant density and organic nutrient management in finger millet - green pea cropping system (pooled data of 2 years).

Treatment	N	P	K
A. Seed rate			
100%	4.07	9.41	49.30
125%	5.58	12.64	51.37
150%	4.79	11.62	50.11
SEm±	0.45	0.45	2.22
CD (P=0.05)	1.09	1.08	5.31
B. Organic Manure levels			
Control	1.54	5.13	43.95
100% N through FYM	3.81	10.10	49.61
100% N through Vermi-compost	5.45	12.52	51.50
75% N FYM + 25% N Vermi-compost	4.56	11.48	50.44
50% N FYM + 50% N Vermi-compost	7.31	14.55	53.51
25% N FYM + 75% N Vermi-compost	6.21	13.54	52.56
SEm±	0.64	0.64	3.14
CD (P=0.05)	1.54	1.53	7.51
Interaction (A x B)	NS	NS	NS
CV%	10.03	14.14	11.77

Table-9: Total N, P & K uptake (kg/ha) of finger millet as influenced by plant density and organic nutrient management in finger millet - green pea cropping system (pooled data of 2 years).

Treatment	N	P	K
A. Seed rate			
100%	29.04	10.97	56.39
125%	32.68	14.37	58.89
150%	30.8	13.27	57.44
SEm±	0.87	0.45	2.30
CD (P=0.05)	2.08	1.08	5.49
B. Organic Manure levels			
Control	20.20	6.24	49.12
100% N through FYM	29.18	11.69	56.90
100% N through Vermi-compost	33.26	13.15	58.04
75% N FYM + 25% N Vermi-compost	31.13	14.26	59.35
50% N FYM + 50% N Vermi-compost	36.57	16.49	61.52
25% N FYM + 75% N Vermi-compost	34.71	15.40	60.53
SEm±	1.23	0.64	3.25
CD (P=0.05)	2.95	1.53	7.76
Interaction (A x B)	NS	NS	NS
CV%	12.00	14.95	16.92

Table-10: Grain yield finger (q/ha) millet as influenced by plant density and organic nutrient management in finger millet - green pea cropping system (pooled data of 2 years).

Seed rate (A)	Organic Nutrient Management (B)						
	Control	100% N FYM	100% N Vermi-compost	75% N FYM + 25% N VC	50% N FYM + 50% N VC	25% N FYM + 75% N VC	Mean
100%	7.3	17.3	22.2	20.0	23.1	23.0	18.8
125%	7.9	19.0	24.3	21.5	25.1	24.8	20.4
150%	7.4	18.3	22.7	21.0	23.7	23.4	19.4
Mean	7.5	18.2	23.1	20.8	24.0	23.7	
Seed Rate	SEm±	0.42	**CD(P=0.05)**	1.01			
Organic Nutrient Management	SEm±	0.60	**CD(P=0.05)**	1.43			
Interaction (A x B)	**SEm±**	**1.04**	**CD(P=0.05)**	**2.48**	**CV%**	9.17	

Table-11: Green pod yield (q/ha) of succeeding green pea during *rabi* season as influenced by plant density and organic nutrient management in finger millet during *kharif* season (pooled data of 2 years).

Seed rate (A)	Organic Nutrient Management (B)						
	Control	100% N FYM	100% N Vermi-compost	75% N FYM + 25% N VC	50% N FYM + 50% N VC	25% N FYM + 75% N VC	Mean
100%	60.8	85.2	85.2	87.6	93.1	91.2	83.9
125%	62.6	93.2	93.2	91.2	94.4	94.0	89.1
150%	52.9	86.8	86.8	89.2	92.0	91.6	84.3
Mean	58.8	88.4	88.4	89.3	93.1	92.2	
Seed rate	**SEm±**	**1.80**	**CD(P=0.05)**	**4.30**			
Organic Nutrient Management	**SEm±**	**2.55**	**CD(P=0.05)**	**6.08**			
Interaction (A x B)	**SEm±**	**4.41**	**CD(P=0.05)**	**10.54**	**CV%**	8.84	