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Short communication

Influence of integrated nutrient management in ridge gourd [*Luffa acutangula* (Roxb.) L.]

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The major effect of green revolution is that our agriculture has become chemicalized. As the availability of land is decreasing day by day, application of chemical fertilizers has become necessary to meet the demand for food grains. So to sustain soil health and benign environment, balanced application of organic and inorganic fertilizers is essential. Much research has been conducted on the use of inorganic fertilizers in ridge gourd to increase the production and productivity of the crop. Ridge gourd is an important cucurbitaceous vegetable crop, widely grown all over the Andhra Pradesh. In vine crops like ridge gourd the integrated use of organic and inorganic fertilizers, offer good opportunity to increase the yield and quality parameters. Hence, an attempt has been made to study the influence of integrated nutrient management on yield and quality characters of ridge gourd.

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The present investigation was carried out at Agricultural Research Institute, Rajendranagar, and Hyderabad during Kharif season of 2005 and 2006. The soil of the experimental plot was clay loam with pH of 8.0, organic carbon content 0.48% and available N, P_2O_5 and K_2O were 267, 42.5 and 335 kg/ha respectively. The experiment was laid out in a randomized block design with three replications and 13 treatments. The details of treatment schedules are- T1 (Recommended dose of N, P_2O_5 & K_2O (100-50-50 kg/ha); T2 – vermicompost (VC) @ 5.8 t/ha; T3 - FYM @ 20 t/ha; T4 - poultry manure (PM) @ 5.0 t/ha; T5 – 50% FYM + 50% of Recommended dose of Nitrogenous fertilizer (RNF); T6 – 50% VC + 50% RNF; T7 – 50% PM +50% of RNF ; T8 – 25% of FYM + 75% of RNF; T9 – 25% of VC + 75% of RNF ; T10 - 25% of PM + 75% of RNF; T11 – 75% of FYM + 25% of RNF; T12 - 75% of VC + 25% of RNF; T13 – 75% of PM + 25% of RNF. The seeds of ridge gourd variety Pusa Nasdar were sown at a spacing of 2.5 m x 0.75m after the through incorporation of organic manures in the soil. Recommended agronomic practices and plant protection measures were taken up. Five randomly selected plants were taken for recording the biometrical characters like vine length, days to 50% flowering, days to picking, fruit characters and yield. The data was analyzed by the method advocated by Panse and Sukhatme (1978). The edible stages of ridge gourd fruits were used for the analysis of quality characters. The quality parameters like ascorbic acid, reducing sugars and total sugar content was recorded by following the procedure as suggested by Saini *et al.* (2001). The soil nutrient status was analyzed before the application of treatments and after the harvesting of the crop.

Significant variations among the treatments for the characters vine length, days to 50% flowering, fruit

Table 1: Yield and yield attributing characters of ridge gourd as influenced by INM

Treatments	Vine length (cm)	Days to 50% flowering	Days to pcking	Fruit lngth (cm)	Fruit girth (cm)	Fruit wt. gm)	No. of fruits /vine	Yield (/ha)
RDF	6.48	48.00	63.00	40.23	12.87	206	8.33	6.83
VC	8.53	48.33	67.33	39.75	14.76	298	7.33	8.72
FYM	7.97	48.00	71.67	37.93	13.78	204	7.67	6.27
PM	7.61	48.67	67.33	38.37	13.07	227	8.00	7.28
50%FYM+50%RDF	7.62	49.33	69.67	38.13	12.76	258	7.00	6.19
50%VC+50%RDF	7.87	47.00	67.33	35.53	13.60	211	7.33	7.17
50%PM+50%RDF	7.50	48.33	67.33	34.67	13.28	215	10.67	9.14
25%FYM+75%RDF	8.44	48.00	66.00	36.76	12.41	204	7.00	5.74
25%VC+75%RDF	8.54	50.33	68.33	36.93	13.87	207	8.33	6.82
25%PM+75%RDF	6.37	47.67	66.00	37.02	14.35	262	8.33	8.69
75%FYM+25%RDF	8.57	49.33	69.00	37.27	14.54	216	7.67	6.63
75%VC+25%RDF	9.23	47.67	66.33	33.63	14.98	239	7.67	7.32
75%PM+25%RDF	7.18	47.67	64.00	32.17	14.84	229	9.00	8.21
SEm ±	0.16	0.51	0.56	1.01	0.31	6.72	0.002	0.68
CD	0.47	1.48	NS	3.05	NS	20.11	0.007	2.08

Table 2: Quality characters of ridge gourd fruit as influenced by INM

Treatments	Moisture %	TSS (^{o}B)	Ascorbic acid (mg/100g)	Total sugars (%)	Reducing sugars (%)
RDF	92.79	2.6	0.38	8.92	5.00
VC	92.35	2.9	0.77	10.24	5.36
FYM	93.09	3.0	1.15	8.44	4.31
PM	92.14	3.0	1.15	11.40	5.30
50%FYM+50%RDF	92.79	3.0	0.77	8.68	4.95
50%VC+50%RDF	93.29	2.6	0.77	8.69	4.90
50%PM+50%RDF	92.08	3.3	1.15	9.21	5.01
25%FYM+75%RDF	93.11	3.0	1.15	6.04	4.8
25%VC+75%RDF	93.94	2.9	0.38	7.73	4.61
25%PM+75%RDF	93.05	3.2	1.15	8.69	4.70
75%FYM+25%RDF	93.26	3.1	1.15	5.12	4.80
75%VC+25%RDF	93.58	2.0	1.14	6.61	4.70
75%PM+25%RDF	92.96	3.3	2.15	7.66	4.75
SEm ±	0.03	0.32	0.02	0.32	0.15
CD	0.09	NS	0.07	0.94	0.44

Table 3: Soil nutrient status as influenced by INM in ridge gourd

Treatments	Organic carbon	pH	EC	Available N	P_2O_5	K_2O
RDF	0.48	8.20	0.208	278.3	47.25	322.1
VC	0.48	8.22	0.210	280.1	47.20	330.5
FYM	0.50	8.24	0.193	281.4	53.50	327.0
PM	0.49	8.24	0.199	298.0	49.50	349.9
50%FYM+50%RDF	0.51	8.21	0.199	284.4	48.95	339.5
50%VC+50%RDF	0.51	8.22	0.146	291.8	46.60	328.7
50%PM+50%RDF	0.52	8.20	0.212	283.4	48.85	344.5
25%FYM+75%RDF	0.48	8.25	0.192	282.4	51.00	341.8
25%VC+75%RDF	0.51	8.24	0.203	287.4	51.10	340.6
25%PM+75%RDF	0.53	8.25	0.200	289.1	49.20	338.4
75%FYM+25%RDF	0.49	8.23	0.197	292.9	53.70	339.2
75%VC+25%RDF	0.51	8.24	0.204	298.4	52.20	343.8
75%PM+25%RDF	0.54	8.27	0.205	295.9	51.00	343.5
SEm ±	0.011	0.021	0.010	2.69	0.85	1.77
CD	0.035	NS	NS	8.29	2.63	5.46

length, weight and yield were observed (Table 1). The integrated approach of nutrient application improved these characters when compared to sole application of recommended dose of fertilizer. Application of 75% of vermicompost + 25% of RNF recorded maximum vine length of 9.23m and was on par with that of 75% of FYM + 25% of RNF (8.57m). Regarding to earliness of the crop there is no significant difference when organic manures or RDF alone were applied. However the combination of 50% VC and 50% RNF showed earliness in flowering (47 days). When the % of RNF was further increased to 75% in combination with 25% VC, the flowering was delayed up to 50 days.

With regards to yield and yield attributes, RDF has recorded maximum fruit length of 40.23 cm than other treatments. However fruit weight was significantly maximum (298g) in vermicompost treated plots which is followed by 25% PM + 75% RNF (262 g). The application of 50% PM in combination with 50% RNF significantly increased the yields (9.14 t/ha) with 33.8% increase over control (RDF). This may be due to the presence of more % of N in poultry manure than the other two organic manures. FYM alone or 75% FYM in combination with 25% RNF observed very low yields of 6.27 and 6.63 t/ha respectively. The beneficial effect of organic manures on yield and other characters could be attributed to the fact that the decomposition and mineralization of organic manures made the nutrients readily available to the plant (Singh and Asrey, 2005) and also had solubilizing effect on fixed form of nutrients in the soil (Kumaran *et al.*, 1998).

Quality characters of the fruit were improved with the application of organic manures in combination with RNF compared to either RDF or organic manures alone (Table 2). Significantly more moisture % (93.29 to 93.94) was found in INM treatments having vermicompost as organic manure. Where as poultry manure combined with RNF showed more TSS (3.3 to 3.2 ^{o}B) and ascorbic acid content (2.15 to 1.15 mg/100g). On the other hand, low ascorbic acid content (0.38 mg/100 g) and TSS (2.6 ^{o} B) was noticed when inorganic fertilizer alone was applied. Similar findings were also reported by Karitonas *et al.* (2001) in broccoli and in ridge gourd by Sreenivas *et al.* (2000). RDF or organic manures alone or their combination each with 50% have recorded significantly maximum total sugar and reducing sugar content than other treatments.

The analysis of soil nutrient status (Table 3) before the treatmental application and also after the harvest of the crop revealed that the organic carbon and available N was found significantly more in poultry manure treated plot alone or in combination with RNF. Very low organic carbon and available N content was observed in RDF. Similar trend was observed with K_2O also. Where as more P_2O_5 was observed in FYM alone or its combination with RNF followed by poultry manure treated plots.

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