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Seasonal effect of integrated nutrient management on yield attributes and quality parameters of spiny brinjal (*Solanum melongena* L.) var. VRM (BR)-1

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Abstract
A study was conducted to find out seasonal effect of integrated nutrient management on spiny brinjal quality parameters and yield attributes. The spiny brinjal (*Solanum melongena* L.) var. VRM (BR)-1" experiment was conducted at Adhiparasakthi Agricultural College farm, Vellore District, Tamil Nadu. Eleven treatments of integrated nutrient management *viz.*, T_1- RDF of N:P:K (100:50:30 kg/ha.), T_2 – FYM (25 t/ ha.), T_3- Humic acid (20 kg/ha.), T_4- RDF of N:P:K (100:50:30 kg/ha.) +FYM @25 t/ ha, T_5- Humic acid (20 kg/ha.) + RDF of N:P:K (100:50:30 kg/ha.), T_6- *Azospirillum* (2 kg/ha.), T_7- Phosphobacteria (2 kg/ha.), T_8- *Azospirillum* (2 kg/ha.) + Phosphobacteria (2 kg/ha.), T_9 – 75% RDF of N (75 kg/ha.) + 100% RDF of P&K (50:30 kg/ha.) + *Azospirillum* (2 kg/ha.), T_{10} - 75% RDF of P (37.5 kg/ha.) + 100% RDF of N&K (100:30 kg/ha.) + Phosphobacteria (2 kg/ha.) and T_{11} - 75% RDF of N & P (75:37.5 kg/ha.) + 100% RDF of K (30 kg/ha.) + *Azospirillum* (2 kg/ha.) + Phosphobacteria (kg/ha.) replicated thrice in Randomised block design. Among the treatments the results clearly revealed that yield and quality parameters were highly recorded in T_{11} and an economic assessment also highly recorded in treatment T_{11}.

Keywords: Spiny brinjal, quality, season, yield

Introduction
The brinjal or Egg plant is one of the most common vegetable crops grown in tropical to subtropical climate conditions. It also considered as the king of vegetables. Based on climatic conditions various varieties of brinjal are grown across the country. A maximum number of brinjal varieties are available in market based on the size, colour, shape etc., and preference for consumption is varied based on location. Present farming is totally dependent on chemical fertilizers, pesticides and growth regulators for enhancing crop productivity. It is well documented fact that increased dependence of agrochemicals including fertilizers has led to several ill effect on the environment. Generally, solanaceous vegetables require large quantity of major nutrients like nitrogen, phosphorous and potassium in addition to secondary nutrients such as calcium and sulphur for better growth, fruiting and yield. The cost of inorganic fertilizers has been increasing to an extent that they are out of reach of small and marginal farmers. The integrated nutrient management systems approach for crop husbandry is gaining since it is economical cheap, technically sound, practically feasible and paves the way for sustainable agriculture. One part of Integrated Nutrient Management involves the integrated use of mineral fertilizers in combination with organic manures and microbial inoculants to sustain optimum yields to maintain and to improve soil fertility [1, 2]. Spiny brinjal (VRM-1Mullukathiri) is a pure line selection from Elavambadi village of Vellore district of Tamil Nadu. Spines are present in the leaf, stem and calyx of the fruit. This particular variety of brinjal is mainly grown in Tamil Nadu India, especially in the Vellore District region. This variety is very tasty and fresh for longer time compared to other varieties. VRM-1Mullukathiri is high yielding (30-35 t/ha^{-1}) and most suitable for North-Eastern Zone of Tamil Nadu. The study was carried out in spiny brinjal (*Solanum melongena* L.) var. VRM (BR)-1. Since, it is a ruling variety in Vellore, Thiruvannamalai, Tirupattur and Ranipet districts.

Materials and Methods
The field experiment was conducted at Adhiparasakthi Agricultural College farm, Vellore District, Tamil Nadu. The field is situated at 12˚ 15'N latitude and 78˚ 20' E longitude. The maximum temperature ranges from 27 °C in winter to 42 °C in summer, while minimum

temperature varies from 19° C in winter to 24.5° C in summer. The mean annual rainfall is 953 mm. The experiment was laid out in randomized block design with 11 treatment combinations and replicated three times with spiny brinjal. Each plot measured 6m×3m with spacing between plant to plant and row to row was 60×75 cm. The raised seed bed of 1.5 m length, 1.0 m width and 15 cm height was prepared.

Table 1: Treatment Details

S. No	Treatment details
1	T_1- RDF of N:P:K (100:50:30 kg/ha.) (control)
2	T_2 – FYM (25 t/ ha.)
3	T_3- Humic acid (20 kg/ha.)
4	T_4- RDF of N:P:K (100:50:30 kg/ha.) +FYM (25 t/ ha.)
5	T_5- Humic acid (20 kg/ha.) + RDF of N:P:K (100:50:30 kg/ha.)
6	T_6- *Azospirillum* (2 kg/ha.)
7	T_7- Phosphobacteria (2 kg/ha.)
8	T_8- *Azospirillum* (2 kg/ha.) + Phosphobacteria (2 kg/ha.)
9	T_9 – 75% RDF of N (75 kg/ha.) + 100% RDF of P&K (50:30 kg/ha.) + *Azospirillum* (2 kg/ha.)
10	T_{10} - 75% RDF of P (37.5 kg/ha.) + 100% RDF of N&K (100:30 kg/ha.) + Phosphobacteria (2 kg/ha.)
11	T_{11} - 75% RDF of N & P (75:37.5 kg/ha.) + 100% RDF of K (30 kg/ha.) + *Azospirillum* (2 kg/ha.) + Phosphobacteria (kg/ha.)

The observations were recorded and estimated *viz*., total soluble solids, acidity (A.O.A.C) [3], ascorbic acid (Piper) [4], total carbohydrates and total sugars (Somogyi) [5]. The benefit cost ratio of different treatments were calculated on basis of cost of cultivation, gross and net profit and statistical analysis were carried out by the method of Gomez and Gomez [6].

Result and Discussion

Integrated nutrient management practices in rabi and summer season exerted significant effect on yield attributes were presented in Table 2 and 3. Significantly in two seasons, maximum number of flowers/plant (51.80, 54.86), number of fruits/plant (23.50, 23.70), fruit volume (131.82cc, 141.40 cc), fruit length (6.54cm, 6.86cm), fruit girth (18.63cm, 18.73cm) and Yield/plant (1964.60g, 1994.35 g). were recorded in treatment $T_{11.}$ The maximum fruit weight 85.01g, 85.87 g was recorded in T_5 followed by T_4, T_{11}. The yield attributes having a direct relation to bearing and yield of brinjal (Tambe *et al*.,1993). The number of flowers per plant increased due to the combined application of organic, inorganic and bio-fertilizers along with NPK. Similarly, [7-10] also reported high yield attributes in brinjal.

The observed quality parameters in rabi and summer season were presented in Table 4 and 5. Significantly, maximum amount of total soluble solids (4.93°B, 4.94°B), carbohydrate (28.83%, 28.81%), ascorbic acid (14.21mg, 14.22mg) and total sugars (4.51%, 4.59%) were recorded in treatment $T_{11.}$ The high acidity per cent (0.28) were recorded in $T_{2,}$ T_3 in rabi and summer seasons.

The economic assessment of different treatments for spiny brinjal cultivation presented in Figure 1. Maximum net profit Rs.2,16,570/ha. with benefit cost ratio (2.60) was observed in treatment $T_{11.}$

Table 2: Effect of different treatment combinations of INM on yield attributes of spiny brinjal in Rabi

Treatment	Yield Attributes						
	No. of flowers/plant	No. of fruits/plant	Fruit weight(g)	Fruit volume(cc)	Fruit length(cm)	Fruit girth(cm)	Yield/plant(g)
T_1	40.66	19.20	78.27	107.75	4.45	12.40	1502.78
T_2	39.80	19.13	78.26	107.32	4.44	12.34	1497.11
T_3	40.73	19.16	79.04	108.35	4.51	12.50	1514.40
T_4	46.46	21.13	84.69	123.35	5.86	17.66	1789.49
T_5	46.73	21.26	85.01	123.70	5.93	17.69	1807.31
T_6	41.53	20.73	80.89	117.72	4.85	14.80	1667.84
T_7	41.66	20.60	81.15	114.81	4.87	14.78	1671.69
T_8	44.20	20.91	82.49	120.74	5.11	16.88	1724.86
T_9	48.40	22.26	83.14	128.67	6.53	18.62	1850.69
T_{10}	49.06	22.23	83.09	128.57	6.42	18.58	1847.09
T_{11}	51.80	23.50	83.60	131.82	6.54	18.63	1964.60
Mean	44.63	20.91	81.78	119.34	5.41	15.89	1712.53
SE±	1.34	0.355	1.03	4.08	0.18	0.69	46.61
CD at 5%	2.81	0.743	2.16	8.52	0.38	1.45	9742

Table 3: Effect of different treatment combinations of INM on yield attributes of spiny brinjal in Summer

Treatment	Yield Attributes						
	No. of flowers/plant	No. of fruits/plant	Fruit weight(g)	Fruit volume(cc)	Fruit length(cm)	Fruit girth(cm)	Yield/plant(g)
T_1	44.00	19.86	79.18	117.94	4.51	12.72	1572.51
T_2	44.26	19.09	78.52	117.71	4.50	12.71	1498.94
T_3	44.13	19.80	80.80	117.44	4.56	12.78	1599.84
T_4	49.60	22.20	85.60	134.15	5.89	17.86	1900.32
T_5	49.40	22.20	85.87	134.38	5.99	17.92	1906.31
T_6	43.06	20.86	81.69	124.40	4.91	14.92	1700.78

T_7	42.93	20.67	81.97	124.08	4.98	14.91	1694.31
T_8	46.46	20.99	83.22	128.94	5.12	16.99	1746.78
T_9	52.00	22.36	83.95	138.39	6.71	18.69	1877.12
T_{10}	51.66	22.33	83.90	138.40	6.50	18.67	1873.48
T_{11}	54.86	23.70	84.15	141.40	6.86	18.73	1994.35
Mean	47.48	21.27	82.62	128.83	5.50	16.08	1760.43
SE±	0.62	0.269	0.85	2.61	0.05	0.21	14.30
CD at 5%	1.30	0.563	1.79	5.46	0.11	0.44	29.89

Table 4: Effect of different treatment combinations of quality parameters of spiny brinjal in rabi

Treatment	Quality parameters				
	Total Soluble solids (TSS)	Acidity (%)	Ascorbic acid (mg/100g)	Carbohydrate (%)	Total sugar (%)
T_1	4.67	0.27	9.92	22.93	3.74
T_2	4.61	0.28	10.59	21.73	3.67
T_3	4.61	0.28	9.79	22.33	3.72
T_4	4.80	0.20	13.03	25.55	4.20
T_5	4.83	0.23	13.90	25.61	4.22
T_6	4.56	0.26	9.20	22.14	3.72
T_7	4.59	0.26	10.08	22.38	3.68
T_8	4.77	0.24	14.12	23.38	4.07
T_9	4.87	0.22	14.18	27.01	4.37
T_{10}	4.85	0.23	14.20	27.15	4.34
T_{11}	4.93	0.21	14.22	28.83	4.51
Mean	4.73	0.24	12.13	24.45	4.02
SE±	0.07	0.013	0.57	0.53	0.08
CD at 5%	0.15	0.028	1.19	1.11	0.17

Table 5: Effect of different treatment combinations of quality parameters of spiny brinjal in summer

Treatment	Quality Parameters				
	Total Soluble solids (TSS)	Acidity (%)	Ascorbic acid (mg/100g)	Carbohydrate (%)	Total sugar (%)
T_1	4.64	0.25	10.25	22.66	3.68
T_2	4.61	0.28	9.77	22.00	3.74
T_3	4.54	0.27	10.51	22.39	3.71
T_4	4.81	0.21	13.15	25.61	4.20
T_5	4.82	0.23	13.04	25.55	4.22
T_6	4.58	0.26	10.05	22.05	3.65
T_7	4.59	0.25	9.89	22.47	3.80
T_8	4.75	0.25	11.76	23.34	4.07
T_9	4.87	0.22	14.19	27.04	4.33
T_{10}	4.86	0.21	14.19	27.16	4.39
T_{11}	4.94	0.22	14.21	28.81	4.59
Mean	4.72	0.24	11.19	24.46	4.03
SE±	0.09	0.007	0.67	0.38	0.05
CD at 5%	0.19	0.014	1.41	0.79	0.11

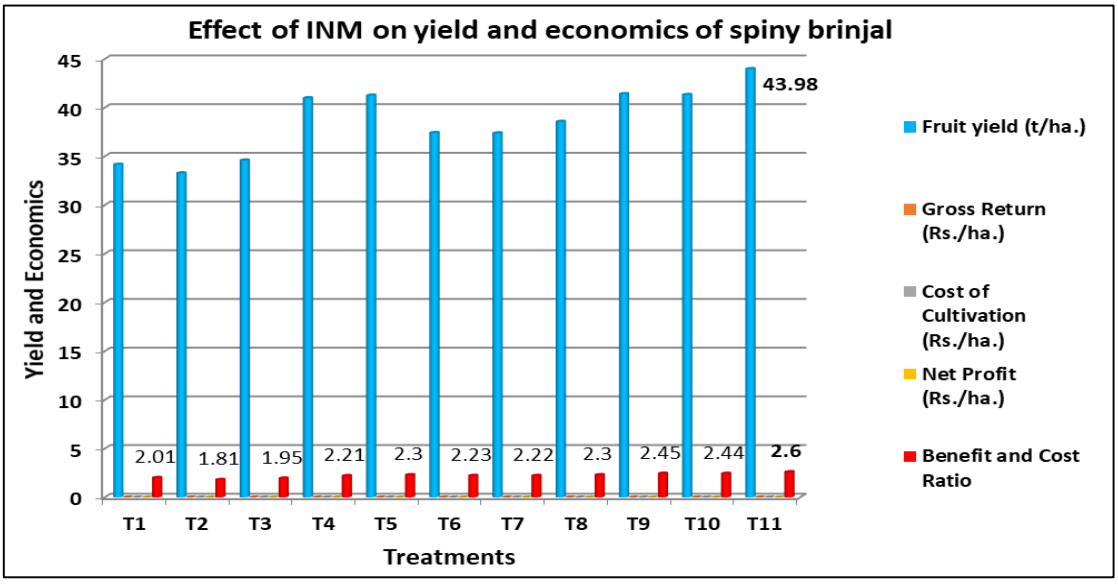

Fig 1: Effect of integrated nutrient management on yield and economics

Conclusion

On the basis of results obtained from research experiment, it can be concluded that in spiny brinjal *(Solanum melongena* L.) var. VRM (BR)-1 application of 75% RDF (150: 37.5: 37.5 NPK kg/ha.) through 75% RDF of N & P (75:37.5 kg/ha.) + 100% RDF of K (30 kg/ha.) + *Azospirillum* (2 kg/ha.) + Phosphobacteria (kg/ha.) consortium was found to be most effective in increasing fruit length, fruit diameter, fruit weight, number of fruits per plant and fruit yield with maximum net realization and Benefit cost ratio. Based on seasonal variation this variety is highly suitable for cultivating around the year.

References

1. Abrol JP, Katyal JC. Managing soil fertility for sustained agricultureI. Proc. Int.Symp. Natural resources management for a sustainable agriculture (Vol.2). Indian Soc. Agron. New Delhi 1990.
2. Thingujam U, Kundu D, Khanam R, Manik D, Thingujam V. Integrated nutrient management in brinjal-A review study. Agricultural Research & Technology: Open Access Journal 2016;1(3):1-4.
3. AOAC. Official method of Analysis of the Association of Official Analytical Chemists.Washington, DC. 1970, 101.
4. Piper CS. Soil plant analysis.Hans Publishers, Bombay 1966.
5. Somogyi M. Notes on sugar determination. J. Biol. chem 1952;200:145-154.
6. Gomez KA, Gomez AA. Statistical procedures for Agricultural research, Second edition, A wiley Interscience publication, New York, USA. 1984.
7. Nanthakumar S, Veeraragavathatham D. Effect of integrated nutrient management on yield and quality attributes of brinjal (Solanum melangena L.cv.Palur-1. South Indian Horticulture 2001;49:195-198.
8. Anburani A, Manivannan K. Effect of integrated nutrient management on growth and in brinjal (Solanum melongena L.) cv.Annamalai. South Indian Horticulture 50(4-6):377-386.
9. Prabhu M, Veeraraghavathatham D, Srinivasan K, Pugalendi L, Rajangam J. Effect ofnutrients on yield, quality and economics of brinjal hybrid COBH-1. South Indian Horticulture 2004;52(1-6):128-134.
10. Wange SS, Kale RH. Effect of bio-fertilizers under graded nitrogen levels on brinjal crop. Journal of Soil and Crops 2004;14(1):9-11.