Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.5853

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **6 (1):** 666-671 (2018)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Effect of Different Levels of Potassium and Vermicompost on Physiological Parameters Leaf Area Plant^{-1}, Leaf Area Index, Crop Growth Rate and Net Assimilation Rate of Potato (*Solanum tuberosum* L.)

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Received: 7.10.2017 | Revised: 15.11.2017 | Accepted: 19.11.2017

ABSTRACT

The field experiment was laid out in the experimental field of department of Horticulture, College of Agriculture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior (M. P.) during autumn-winter season. Experiment was conducted in factorial randomized blocked design with three replication comprised of eight treatments combination (K_1VC_0, K_1VC_1, K_2VC_0, K_2VC_1, K_3VC_0, K_3VC_1, K_4VC_0, K_4VC_1). On the basis of both the year, the data reveals that the treatment K_3 (150 kg K_2O) was observed significantly maximum in all physiological parameters followed by K_2 (100 kgK_2O/ha) as compared to other treatments .However, it was recorded minimum in treatment K_1 (50 kgK_2O/ha).In case of vermicompost, the treatment VC_1 (20 t VC ha^{-1}),recorded significantly maximum in all the parameters while minimum was observed in VC_0 (0 t VC ha^{-1}).Significantly maximum in all parameters (Leaf area plant ,leaf area index, NAR and CGR) were noted in treatment combination K_3VC_1 (150 kgK_2O/ha + 20 t VC/ha) followed by K_2VC_1 (100 kgK_2O/ha+ 20 t VC/ha) at 30, 60 and 90 DAP, respectively. While, it was recorded lowest in treatment K_1VC_0 (50 kgK_2O/ha + 0 t VC/ha). The interaction effect of year and potassium (YXP), year and vermicompost (YXV) and year, potassium and vermicompost (YXPXV) on leaf area plant^{-1} were non-significant in all parameters (Leaf area plant^{-1}, leaf area index, NAR and CGR) at 30,60, and 90 DAP respectively.

Key words: *NAR, CGR, LAI, Vermicompost, Potassium*

INTRODUCTION

The potato (*Solanum tuberosum* L.) is one of the most important food crops both in developed as well as in developing countries. Due to its diversified uses in developed countries as food, feed raw material for producing starch. The potato was generally regarded to be a crop suited for western world. The origin of potato is Peru, South America and belongs to family Solanaceae). In Madhya Pradesh the total area under potato cultivation is 136.0 thousand ha, with production 3048.0 thousand metric tons and productivity is 22.41 mt/ha (Anonymous 2014- 15).

Cite this article: Agrawal, S., Lekhi, R., Patidar, P., Gangle, P., Effect of Different Levels of Potassium and Vermicompost on Physiological Parameters Leaf Area Plant^{-1}, Leaf Area Index, Crop Growth Rate And Net Assimilation Rate Of Potato (*Solanum tuberosum* L.), *Int. J. Pure App. Biosci.* **6(1):** 666-671 (2018). doi: http://dx.doi.org/10.18782/2320-7051.5853

Potato required a numbers of macro and micro plant nutrients for the growth and development of nitrogen, phosphorus and potassium are the most essential plant nutrients that are largely required by potato[4] being strong K loving crop potato required K in larger amount that in consumes N and P K is essential required for synthesis sugar and starch and also for translocation of carbohydrate; it also place and important role in maintaining growth and bigger of the plant[7]. Using of vermicompost is now a global movement for the second green revolution that emphasizes on composting. Vermicomposting is the science of producing compost from biodegradable organic matters through earthworms.

MATERIAL METHODS

The experiment was laid out in randomized complete design (RCBD) with eight treatments replicated three times. The field experiment was laid out in the experimental field of department of Horticulture, College of Agriculture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior (M. P.) during autumn-winter season. Experiment was conducted in factorial randomized blocked design with three replication comprised of eight treatments combination (K_1VC_0, K_1VC_1, K_2VC_0, K_2VC_1, K_3VC_0, K_3VC_1, K_4VC_0, K_4VC_1). As per the treatment vermicompost was applied during final land preparations full dose of Phosphorus and Potash applied as basal dose. Half of nitrogen was applied as basal dose and remaining half was applied as top dressing at the time of first earthing up (30 days after planting). Plant observation such as, LAI, CGR, NAR and Leaf Area/Plant were recorded at 30, 60 and 90 DAP.

To calculate these parameters following formulae were used:

Leaf area index

$$LAI = \frac{A}{P}$$

where,

A= Leaf area

P= Ground area

Net assimilation rate (mg cm$^{2-1}$ day^{-1})

$$NAR = \frac{W_2 - W_1}{A_2 - A_1} \times \frac{\log A_2 - \log A_1}{(t_2 - t_1)}$$

Where,

A_1 and W_1 are the leaf area and dry weight of the plant sample respectively at time t_1 and A_2 and W_2 are the leaf area and dry weight of the plant sample respectively at time t_2.

Crop growth rate (g m$^{2-1}$ day^{-1})

$$CGR = \frac{W_2 - W_1}{P\,(T_2 - T_1)}$$

where,

P = Ground area on which W_1 and W_2 were estimated.

W_1= Dry weight of plant at 1st observation.

W_2= Dry weight of plant at 2nd observation.

T_1 & T_2 = interval between observation.

RESULT AND DISCUSSION

Leaf area plant^{-1} (cm^2)

Based on both year and pooled, data reveals that leaf area plant^{-1} was significantly influenced by various treatments of levels of potassium and vermicompost. The significantly maximum (204.99, 308.93 and 369.97 cm^2) leaf area plant^{-1} was observed under the treatment K_3 (150 kgK_2O/ha) followed by K_2 (100 kgK_2O/ha) (179.95, 271.52 and 333.51 cm^2) as compared to other treatments at 30, 60 and 90 DAP, respectively. However, it was recorded minimum (94.49, 157.74 and 178.96 cm^2) in treatment K_1 (50 kgK_2O/ha) at 30, 60 and 90 DAP, respectively. In case of vermicompost, the significantly maximum (168.61, 257.47 and 307.09 cm^2) was obtained in treatment VC_1 (20 t VC ha^{-1}), however, minimum (140.82, 220.06 and 264.60 cm^2) was noted in VC_0 (0 t VC ha^{-1}) at 30, 60 and 90 DAP, respectively. Significantly maximum (230.56, 347.63 and 416.56 cm^2) leaf area $plant^{-1}$ were noted in treatment combination K_3VC_1 (150 kgK_2O/ha + 20 t VC/ha) followed by K_2VC_1 (100 kgK_2O/ha+ 20 t VC/ha) (198.83, 292.83 and 355.53 cm^2) at 30, 60 and 90 DAP, respectively. While, it was recorded lowest (88.32, 152.55 and 170.25 cm^2) in treatment K_1VC_0 (50 kgK_2O/ha + 0 t VC/ha) at 30, 60 and 90 DAP, respectively. The interaction effect of year and potassium (YXP), year and vermicompost (YXV) and year, potassium and vermicompost (YXPXV) on leaf area $plant^{-1}$ were non-significant at 30, 60 and 90 DAP.

Leaf area index

On the basis of pooled data reveals that K_3 (150 kg K_2O/ha) was significantly maximum (0.171, 0.258 and 0.308) leaf area index followed by K_2 (100 kgK_2O/ha) (0.150, 0.226 and 0.278) at 30, 60 and 90 DAP, respectively and it was calculated minimum (0.079, 0.131 and 0.149) in treatment K_1 at 30, 60 and 90 DAP, respectively. Similarly it was noted significantly maximum (0.141, 0.215 and 0.256) in treatment VC_1 (20 t $VCha^{-1}$), however, minimum (0.117, 0.183 and 0.221) was noted in VC_0 (0 t VC ha^{-1}) at 30, 60 and 90 DAP, respectively. Treatment combination K_3VC_1 (150 kgK_2O/ha + 20 t VC/ha) was noted significantly maximum (0.192, 0.290 and 0.347) leaf area index followed by K_2VC_1 (100 kgK_2O/ha+ 20 t VC/ha) (0.166, 0.244 and 0.296) at 30, 60 and 90 DAP, respectively however, it was recorded lowest (0.074, 0.127 and 0.142) in treatment K_1VC_0 (50 kgK_2O/ha + 0 t VC/ha) at 30, 60 and 90 DAP, respectively. The interaction effect of both year potassium (YXP), and vermicompost (YXV) and, potassium and vermicompost (YXPXV) on leaf area index were non-significant at 30, 60 and 90 DAP.

Net assimilation rate (mg cm^{2-1} day^{-1})

On the basis of both year the data clearly showed that the net assimilation rate (30-60 DAP and 60-90 DAP) was significantly influenced by the different treatments. The NAR in general increased at 60-90 DAP in all the treatments and same trend was notice in both the year. Significantly lowest (0.0011 mg cm^{2-1} day^{-1} at 30-60 DAP and 0.0130 mg cm^{2-1} day^{-1} at 60-90 DAP) net assimilation rate was recorded in treatment K_3 (150 kgK_2O/ha) followed by K_2 (100 kgK_2O/ha) (0.0012 mg cm^{2-1} day^{-1} at 30-60 DAP and 0.0201 mg cm^{2-1} day^{-1} at 60-90 DAP and which were at par with each other at 30-60 DAP. It was calculated maximum (0.0036 mg cm^{2-1} day^{-1} at 30-60 DAP and 0.0329 mg cm^{2-1} day^{-1} at 60-90 DAP) in treatment K_1. Vermicompost, treatment significantly lowest (0.0016 mg cm^{2-1} day^{-1} at 30-60 DAP and 0.0204 mg cm^{2-1} day^{-1} at 60-90 DAP) was noted in treatment VC_1 (20 t VC ha^{-1}), however, maximum (0.0025 mg cm^{2-1} day^{-1} at 30-60 DAP and 0.0244 mg cm^{2-1} day^{-1} at 60-90 DAP) was noted in VC_0 (0 t VC ha^{-1}) .Significantly lowest (0.0005 mg cm^{2-1} day^{-1} at 30-60 DAP and 0.0078 mg cm^{2-1} day^{-1} at 60-90 DAP) net assimilation rate was calculated in treatment combination K_3VC_1 (150 kgK_2O/ha + 20 t VC/ha) followed by K_2VC_1 (100 kgK_2O/ha+ 20 t VC/ha) (0.0008 mg cm^{2-1} day^{-1} at 30-60 DAP and 0.0179 mg cm^{2-1} day^{-1} at 60-90 DAP) in first, second year and pooled, respectively and which were at par with each other at 30-60 DAP. However, it was recorded maximum (0.0038 mg cm^{2-1} day^{-1} at 30-60 DAP and 0.0333 mg cm^{2-1} day^{-1} at 60-90 DAP) in treatment K_1VC_0 (50 kgK_2O/ha + 0 t VC/ha) in first, second year and pooled, respectively. The interaction effect of year and potassium (YXP), year and vermicompost (YXV) and year, potassium and vermicompost (YXPXV) on net assimilation rate were non-significant at 30- 60 and 60-90 DAP.

Crop growth rate (g m^{2-1} day^{-1})

On the basis of both year mean data clearly indicated that there was significant difference amongst the treatments at both the stages of observations. In general CGR increased with increase in crop growth stages and same trend was notice in both the year and pooled also.

The maximum (0.127 g m^{2-1} day^{-1} at 30-60 DAP and 1.186 g m^{2-1} day^{-1} at 60-90 DAP) crop growth rate was observed under the treatment K_1 (50 kgK_2O/ha). Therefore, it was observed lowest (0.053 g m^{2-1} day^{-1} at 30-60 DAP and 0.205 g m^{2-1} day^{-1} at 60-90 DAP) in K_3 (150 kgK_2O/ha) followed by K_2 (100 kgK_2O/ha) (0.054 g m^{2-1} day^{-1} at 30-60 DAP and 0.609 g m^{2-1} day^{-1} at 60-90 DAP) and which were at par with each other at 30-60 DAP. Vermicompost, treatment significantly lowest (0.064 g cm^{2-1} day^{-1} at 30-60 DAP and 0.618 g cm^{2-1} day^{-1} at 60-90 DAP) was noted in treatment VC_1 (20 t VC ha^{-1}) and maximum (0.099 g cm^{2-1} day^{-1} at 30-60 DAP and 0.724 g cm^{2-1} day^{-1} at 60-90 DAP) was noted in VC_0 (0 t VC ha^{-1}) in both year mean , respectively.

Significantly lowest 0.030 g cm^{2-1} day^{-1} at 30-60 DAP and 0.107 g m^{2-1} day^{-1} at 60-90 DAP) crop growth rate was calculated in treatment combination K_3VC_1 (150 kgK_2O/ha + 20 t VC/ha) followed by K_2VC_1 (100 kgK_2O/ha+ 20 t VC/ha) (0.036 g cm^{2-1} day^{-1} at 30-60 DAP and 0.302 g cm^{2-1} day^{-1} at 60-90 DAP) and which were at par with each other at 30-60 DAP only. However, it was recorded maximum (0.135 g cm^{2-1} day^{-1} t 30-60 DAP and 1.241 g m^{2-1} day^{-1} at 60-90 DAP) in treatment K_4VC_0 (200 kgK_2O/ha + 0 t VC/ha)

The interaction effect of year and potassium (YXP), year and vermicompost (YXV) and year, potassium and vermicompost (YXPXV) on crop growth rate were non-significant at 30- 60 and 60-90 DAP. This could be due to the application of doses of potassium fertilizer increase the uptake/ availability of nitrogen, which might be promoting growth to enhance synthesis of or accumulation of proteins, amino acids and enzymes which are responsible for cell division and cell elongation thus resulted in improvement in leaf area index. The findings are in close harmony with the result of Singh and Lal Sandhu *et al.*, Azarpour *et al*. and Fekadu Asfaw . The increase in leaf area index in response to increasing rate of potassium and vermicompost may be ascribed to the availability of optimum nutrients contained in manure that led to high leaf area index through facilitated vegetative growth. The findings are in close harmony with the result of Banerjee *et al.* This revealed that as the LAI increased the shading effect of the leaves may have caused reduction in photosynthesis and NAR. It may also be due to the reduced photosynthesis of the older leaves. These findings are in agreement with the findings of Banerjee *et al*.

Table 1: Leaf area $plant^{-1}$ (cm^2) at different stages of potato as influenced by different levels of potassium and vermicompost at first, second year and pooled

Treat. Symb.	Treatment	Leaf area $plant^{-1}$ (cm^2) at								
		First year			Second year			Pooled		
		30 DAP	60 DAP	90 DAP	30 DAP	60 DAP	90 DAP	30 DAP	60 DAP	90 DAP
K_1	50 kgK_2O/ha	89.06	151.17	170.77	99.92	164.30	187.15	94.49	157.74	178.96
K_2	100 kgK_2O/ha	172.91	262.58	321.93	186.99	280.47	345.08	179.95	271.52	333.51
K_3	150 kgK_2O/ha	197.18	298.93	356.62	212.80	318.94	383.33	204.99	308.93	369.97
K_4	200 kgK_2O/ha	133.29	208.90	251.00	145.56	224.84	270.87	139.42	216.87	260.94
SEm ±		1.75	1.24	1.87	1.84	2.03	2.77	1.19	1.15	1.65
CD 5%		5.32	3.75	5.68	5.59	6.15	8.41	3.44	3.33	4.79
VC_0	0 t VC/ha	134.61	211.92	254.38	147.03	228.21	274.81	140.82	220.06	264.60
VC_1	20 t VC/ha	161.61	248.87	295.78	175.60	266.07	318.40	168.61	257.47	307.09
SEm ±		1.24	0.87	1.32	1.30	1.43	1.96	0.84	0.81	1.17
CD 5%		3.76	2.65	4.02	3.95	4.35	5.94	2.43	2.36	3.39
K_1VC_0	50 kgK_2O/ha + 0 t VC/ha	83.25	146.23	162.07	93.39	158.87	178.43	88.32	152.55	170.25
K_1VC_1	50 kgK_2O/ha + 20 t VC/ha	94.87	156.12	179.47	106.44	169.73	195.86	100.65	162.92	187.67
K_2VC_0	100 kgK_2O/ha+ 0 t VC/ha	154.33	241.57	300.27	167.80	258.85	322.70	161.07	250.21	311.49
K_2VC_1	100 kgK_2O/ha+ 20 t VC/ha	191.49	283.58	343.59	206.18	302.08	367.47	198.83	292.83	355.53
K_3VC_0	150 kgK_2O/ha+ 0 t VC/ha	172.29	260.69	311.62	186.56	279.79	335.16	179.42	270.24	323.39
K_3VC_1	150 kgK_2O/ha+ 20 t VC/ha	222.07	337.16	401.62	239.04	358.10	431.49	230.56	347.63	416.56
K_4VC_0	200 kgK_2O/ha + 0 t VC/ha	128.57	199.19	243.58	140.35	215.33	262.96	134.46	207.26	253.27
K_4VC_1	200 kgK_2O/ha + 20 t VC/ha	138.02	218.62	258.43	150.76	234.35	278.78	144.39	226.48	268.60
SEm ±		2.48	1.75	2.65	2.61	2.87	3.92	1.68	1.63	2.34
CD 5%		7.52	5.31	8.04	7.90	8.70	11.89	4.86	4.71	6.77

Table 2: Leaf area index at different stages of potato as influenced by different levels of potassium and vermicompost at first, second year and pooled

Treat. Symb.	Treatment	Leaf area index at								
		First year			Second year			Pooled		
		30 DAP	60 DAP	90 DAP	30 DAP	60 DAP	90 DAP	30 DAP	60 DAP	90 DAP
K_1	50 kgK_2O/ha	0.074	0.126	0.142	0.085	0.137	0.156	0.079	0.131	0.149
K_2	100 kgK_2O/ha	0.144	0.219	0.268	0.156	0.234	0.288	0.150	0.226	0.278
K_3	150 kgK_2O/ha	0.164	0.249	0.297	0.177	0.266	0.320	0.171	0.258	0.308
K_4	200 kgK_2O/ha	0.111	0.174	0.209	0.121	0.187	0.226	0.116	0.181	0.218
SEm ±		0.003	0.004	0.004	0.003	0.006	0.003	0.002	0.003	0.002
CD 5%		0.010	0.012	0.011	0.009	0.019	0.010	0.006	0.010	0.007
VC_0	0 t VC/ha	0.112	0.177	0.212	0.123	0.190	0.229	0.117	0.183	0.221
VC_1	20 t VC/ha	0.135	0.208	0.246	0.147	0.222	0.265	0.141	0.215	0.256
SEm ±		0.002	0.003	0.003	0.002	0.005	0.002	0.001	0.002	0.002
CD 5%		0.007	0.008	0.008	0.006	0.014	0.007	0.004	0.007	0.005
K_1VC_0	50 kgK_2O/ha + 0 t VC/ha	0.069	0.122	0.135	0.078	0.132	0.149	0.074	0.127	0.142
K_1VC_1	50 kgK_2O/ha + 20 t VC/ha	0.079	0.130	0.149	0.092	0.141	0.163	0.085	0.136	0.156
K_2VC_0	100 kgK_2O/ha+ 0 t VC/ha	0.129	0.202	0.250	0.140	0.216	0.269	0.134	0.209	0.260
K_2VC_1	100 kgK_2O/ha+ 20 t VC/ha	0.160	0.236	0.286	0.172	0.252	0.306	0.166	0.244	0.296
K_3VC_0	150 kgK_2O/ha+ 0 t VC/ha	0.144	0.217	0.259	0.156	0.234	0.279	0.150	0.225	0.269
K_3VC_1	150 kgK_2O/ha+ 20 t VC/ha	0.185	0.281	0.335	0.199	0.298	0.360	0.192	0.290	0.347
K_4VC_0	200 kgK_2O/ha + 0 t VC/ha	0.107	0.166	0.203	0.117	0.179	0.219	0.112	0.173	0.211
K_4VC_1	200 kgK_2O/ha + 20 t VC/ha	0.115	0.182	0.215	0.126	0.195	0.232	0.120	0.189	0.224
SEm ±		0.005	0.005	0.005	0.004	0.009	0.005	0.003	0.005	0.003
CD 5%		0.014	0.016	0.016	0.012	0.027	0.015	0.008	0.014	0.009

Table 3: Net assimilation rate during at different stages of potato as influenced by different levels of potassium and vermicompost at first, second year and pooled

Treat. Symb.	Treatment	Net assimilation rate (mg cm^{2-1} day^{-1}) at					
		First year		Second year		Pooled	
		30-60 DAP	60-90 DAP	30-60 DAP	60-90 DAP	30-60 DAP	60-90 DAP
K_1	50 kgK_2O/ha	0.0037	0.0341	0.0036	0.0316	0.0036	0.0329
K_2	100 kgK_2O/ha	0.0011	0.0203	0.0012	0.0200	0.0012	0.0201
K_3	150 kgK_2O/ha	0.0011	0.0134	0.0010	0.0126	0.0011	0.0130
K_4	200 kgK_2O/ha	0.0024	0.0244	0.0023	0.0230	0.0023	0.0237
SEm ±		0.0001	0.0010	0.0001	0.0009	0.0001	0.0006
CD 5%		0.0002	0.0030	0.0003	0.0028	0.0002	0.0018
VC_0	0 t VC/ha	0.0025	0.0253	0.0025	0.0236	0.0025	0.0244
VC_1	20 t VC/ha	0.0016	0.0208	0.0016	0.0199	0.0016	0.0204
SEm ±		0.00004	0.0007	0.0001	0.0007	0.0000	0.0004
CD 5%		0.00013	0.0022	0.0002	0.0020	0.0001	0.0013
K_1VC_0	50 kgK_2O/ha + 0 t VC/ha	0.0039	0.0348	0.0037	0.0317	0.0038	0.0333
K_1VC_1	50 kgK_2O/ha + 20 t VC/ha	0.0035	0.0335	0.0034	0.0315	0.0035	0.0325
K_2VC_0	100 kgK_2O/ha+ 0 t VC/ha	0.0015	0.0228	0.0017	0.0218	0.0016	0.0223
K_2VC_1	100 kgK_2O/ha+ 20 t VC/ha	0.0008	0.0177	0.0008	0.0182	0.0008	0.0179
K_3VC_0	150 kgK_2O/ha+ 0 t VC/ha	0.0017	0.0188	0.0016	0.0176	0.0016	0.0182
K_3VC_1	150 kgK_2O/ha+ 20 t VC/ha	0.0005	0.0080	0.0005	0.0075	0.0005	0.0078
K_4VC_0	200 kgK_2O/ha + 0 t VC/ha	0.0031	0.0246	0.0029	0.0233	0.0030	0.0240
K_4VC_1	200 kgK_2O/ha + 20 t VC/ha	0.0017	0.0242	0.0016	0.0226	0.0017	0.0234
SEm ±		0.0001	0.0014	0.0001	0.0013	0.0001	0.0009
CD 5%		0.0003	0.0043	0.0004	0.0040	0.0002	0.0026

Table 4: Crop growth rate at different stages of potato as influenced by different levels of potassium and vermicompost at first, second year and pooled

Treat. Symb.	Treatment	Crop growth rate (30-60 DAP) at					
		First year		Second year		Pooled	
		30-60 DAP	60-90 DAP	30-60 DAP	60-90 DAP	30-60 DAP	60-90 DAP
K_1	50 kgK_2O/ha	0.127	1.183	0.127	1.189	0.127	1.186
K_2	100 kgK_2O/ha	0.052	0.606	0.056	0.612	0.054	0.609
K_3	150 kgK_2O/ha	0.053	0.202	0.053	0.208	0.053	0.205
K_4	200 kgK_2O/ha	0.094	0.682	0.092	0.688	0.093	0.685
SEm ±		0.002	0.035	0.004	0.034	0.002	0.022
CD 5%		0.005	0.105	0.011	0.105	0.006	0.063
VC_0	0 t VC/ha	0.098	0.722	0.100	0.727	0.099	0.724
VC_1	20 t VC/ha	0.065	0.615	0.064	0.621	0.064	0.618
SEm ±		0.001	0.025	0.003	0.024	0.001	0.015
CD 5%		0.004	0.074	0.008	0.074	0.004	0.045
K_1VC_0	50 kgK_2O/ha + 0 t VC/ha	0.135	1.239	0.134	1.244	0.135	1.241
K_1VC_1	50 kgK_2O/ha + 20 t VC/ha	0.120	1.128	0.119	1.134	0.120	1.131
K_2VC_0	100 kgK_2O/ha+ 0 t VC/ha	0.067	0.611	0.077	0.617	0.072	0.614
K_2VC_1	100 kgK_2O/ha+ 20 t VC/ha	0.036	0.300	0.036	0.305	0.036	0.302
K_3VC_0	150 kgK_2O/ha+ 0 t VC/ha	0.076	0.600	0.075	0.607	0.075	0.603
K_3VC_1	150 kgK_2O/ha+ 20 t VC/ha	0.030	0.104	0.030	0.110	0.030	0.107
K_4VC_0	200 kgK_2O/ha + 0 t VC/ha	0.116	0.736	0.115	0.742	0.115	0.739
K_4VC_1	200 kgK_2O/ha + 20 t VC/ha	0.072	0.628	0.070	0.633	0.071	0.631
SEm ±		0.003	0.049	0.005	0.049	0.003	0.031
CD 5%		0.008	0.149	0.016	0.148	0.008	0.090

CONCLUSION

On the basis of present experiment results revealed that Physiological parameters viz., leaf Area/ Plant, LAI, CGR and NAR were found superior in Treatment K_3 (150 kg K_2O) as compared to other treatments. Treatment VC_1 was found superior in case of Vermicompost for all the parameters. In treatment combination K_3Vc_1 was found best for all the growth analytical parameters

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