ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 11, pp.74960-74962, November, 2018

DOI: https://doi.org/10.24941/ijcr.32883.11.2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

NUTRIENTS MANAGEMENT FOR HIGHER VEGETABLE PEA SEED PRODUCTION UNDER EDAPHIC CONDITION OF UTTAR PRADESH

***Singh, R.A., Subhash Chandra, Ram Prakash, Pal, S.B. and Jitendra Singh**

C.S. Azad University of Agriculture and Technology, Kanpur (U.P.), India

ARTICLE INFO

Article History:
Received 20th August, 2018
Received in revised form
19th September, 2018
Accepted 27th October, 2018
Published online 29th November, 2018

Key words:

Confine, Concordance,
Dry kernels, Edpahic condition,
Nutrients combination.

ABSTRACT

The field study was under taken during autumn season at Regional Research Station, Mainpuri, C.S. Azad University of Agriculture and Technology, Kanpur (U.P.) with the objective to findout suitable combination of nutrients and variety of vegetable pea for degraded edaphic condition. Sowing of cultivar *Azad P-1* gave significantly higher dry kernel yield by 12.15 q/ha over *Arkel* (8.94 q/ha) and *Azad P-3* (8.82 q/ha). Application of $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha significantly increased the dry kernel yield of vegetable pea (13.10 q/ha), thereafter, significant reduction was computed at further installment of nutrients. Application of highest dose of $N_{80} + P_{80} + K_{60} + S_{30} + Ca_{60}$ kg/ha produce statistically at par seed yield of vegetable pea(8.63 q/ha) to control (7.67 q/ha). Therefore, the installment of nutrients combination beyond $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha confined to the further progress in dry kernel production. The growth and yield contributing parameters were concordance to the dry kernel yield.

Citation: Singh, R.A., Subhash Chandra, Ram Prakash, Pal, S.B. and Jitendra Singh, 2018. "Nutrients management for higher vegetable pea seed production under edaphic condition of Uttar Pradesh", *International Journal of Current Research*, 10, (11), 74960-74962.

INTRODUCTION

In present condition, the burgeoning demography pressure has forced for improved seed production with better nutrients management to replace the old seeds and increase the farm productivity. The prolong and over usage of chemical fertilizers without balanced has, however, resulted in human and soil health hazards and pollution of the environment. The quality seed is play important role as a basic input in agriculture. The quality of seed used by farmers determines the status of agriculture they practices. However, for maximum grain/kernel in productivity in any crop, use of both improved varieties and improved integrated crop management practices are required. Not only they contribute to increase productivity individually, but they also act synergistically. Seed of improved varieties is a costly input, more so in case of vegetable pea, where the non-availability of improved varieties seed is a major constraint in most of vegetable pea growing area because the most of the farmers harvest their vegetable pea for green pods purposes. Unfortunately, the public sector seed agencies have not been able to meet the demand of good quality seed of improved varieties of vegetable pea in many areas. There remain a large gap between the seed demand and seed supply, resulting in, low area coverage by the improved varieties in this crop. For increasing the availability and replacing the old seed of vegetable pea, the seed production programme was under taken on farmers fields of Kanpur Nagar and Jalaun by Singh *et al.* (2011) and they reported that cultivar *Azad P-3* gave seed yield of 13.55 q/ha at farmers fields of Jalaun and '*Arkel*' produced by 11.34 q/ha at farmers field of Kanpur Nagar. Singh *et al.* (2015) also reported that variety *Kashi Mukti* registered highest seed yield by 15.37 q/ha, while *Kashi Uday* and *Azad P-3* gave kernel yield by 13.98 q/ha and 12.25 q/ha, respectively, from the farmers field of Bundelkhand, U.P. But feedback received from these study that the farmers did not follow the proper management of nutrients. With the view to harvest the quality seed without impairing the soil fertility, the present study was planned and conducted. The objective of this study was to find out the suitable variety of vegetable pea and its nutrients combination for maximum seed production from degraded edaphic condition.

MATERIALS AND METHODS

The present study was under taken during autumn season at Regional Research Station, Mainpuri, C.S. Azad University of Agriculture and Technology, Kanpur The soil was sandy loam, having pH 8.5, organic carbon 0.45%, total nitrogen 0.04%, available phosphorus 10 kg/ha and available potassium 278 kg/ha, therefore, the nutrients of experimental soil were analysed low in organic carbon, total nitrogen, available phosphorus and high in available potassium. The pH was determined by Electrometric glass electrode method (Piper, 1950), while organic carbon was determined by Colorimetric method (Datta *et al.,* 1962). Total nitrogen was analysed by Kjeldahl's method as discussed by Piper (1950). The available phosphorus and potassium were determined by Olsen's method (Olsen *et al.,* 1954) and Flame photometric method (Singh,

****Corresponding author:*** **Singh, R.A.,**
C.S. Azad University of Agriculture and Technology, Kanpur (U.P.), India

1971), respectively. Three varieties of vegetable pea *Arkel, Azad P-1*and *Azad P-3* under four level of nutrients combination i.e. control, $N_{20} + P_{40} + K_{20} + S_{10} + Ca_{20}$, $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ and $N_{80} + P_{80} + K_{60} + S_{30} + Ca_{60}$ kg/ha were tested. Vegetable pea cultivars were planted in first fortnight of November and harvested in the end of first fortnight of March after complete maturity at 120 days of seeding during both experimental years. The recommended agronomical practices were followed as suggested by Singh *et al.* (2010). The irrigations were given at flowering, pods formation and kernel formation/pods filling stage. The experiment was laidout in factorial R.B.D. with three replications. The experimental data of both years were statistically analysed as suggested by Gomez and Gomez (1984).

RESULTS AND DISCUSSION

The two years pooled data of growth and yield contributing traits and individual year data of kernel yield q/ha have been presented in Table 1 and Table 2 respectively, and discussed here under appropriate heads.

Effect on growth parameters: The three varieties raised with four levels of nutrients combination under degraded edaphic condition. Perusal of data make it clear that the different varieties of vegetable pea did not influence to the plant height by different combination of nutrients. The numerically increased was noted upto tested dose of $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha. Not much variation was noted in height of plant under different varieties of vegetable pea. Almost similar trend was also found in the branches/plant under different levels of nutrients integration and tested varieties. Increase doses of N, P, K, S & Ca increased the pod length considerably over control. Highest pod length was noted at $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha, however, the minimum pod length was measured at control. Among the tested variety, varieties *Azad P-1* displayed the superiority over the *Azad P-3* and *Arkel* (Table 1). This was due to genetical variation of genotypes. These findings are commensurable to the results of Singh *et al.* (2011) and Singh *et al.* (2015).

Effect on yield contributing characters: The numerical increase was noted in pods/plant with increase doses of nutrients over control. The highest pods/plant was counted at $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha under all the tested cultivars. The lowest pods/plant was counted at control. The tested varieties displayed almost equal number of pods/plant at various levels of nutrients combination. Among the tested genotypes, cultivar *Azad P-1* gave highest pods/plant as compared to *Azad P-3* and *Arkel*. Application of $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha produced maximum kernel weight/plant under all the tested varieties. Cultivar Azad P-1 produced highest kernel weight/plant at each level of nutrients contribution in comparison to *Azad P-3* and *Arkel*. The similar trend was also found in 100-kernel weight at different levels of nutrients combination as well as in tested genotypes. These findings support to the results of Singh *et al.* (2011) and Singh *et al.* (2015).

Effect on kernel yield (q/ha) of vegetable pea: Kernel yield available in Table 2 clearly display that the cultivar *Azad P-1* gave significantly highest yield by 12.15 q/ha in comparison to cultivars *Arkel* (8.94 q/ha) and *Azad P-3* (8.82 q/ha). Variety *Azad P-1* gave highest yield over *Arkel* and *Azad P-3* by a margin of 3.21 q/ha or 35.90% and 3.33 q/ha or 37.75%, respectively.

Table 1. Effect of nutrient combination on growth and yield traits (pooled data of two years)

Treatment	Plant height (cm)	Branches/ plant	Pod length (cm)	Pods/ plant	Kernels/ pod	Kernels weight / plant (g)	100- kernel weight (g)
Arkel							
Control	31.83	3.17	5.85	8.13	6.10	9.82	19.50
$N_{20} + P_{40} + K_{20} + S_{10} + Ca_{20}$	35.33	3.25	6.10	8.65	6.80	11.65	20.30
$N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$	37.66	3.31	6.15	8.70	6.92	11.72	20.30
$N_{80} + P_{80} + K_{60} + S_{30} + Ca_{60}$	34.70	3.21	6.00	8.42	6.35	10.90	20.00
Azad P-1							
Control	31.88	3.20	5.90	8.15	6.50	9.86	19.61
$N_{20} + P_{40} + K_{20} + S_{10} + Ca_{20}$	35.45	3.28	6.20	8.70	6.90	11.75	20.35
$N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$	38.00	3.35	6.25	8.78	6.91	11.77	20.37
$N_{80} + P_{80} + K_{60} + S_{30} + Ca_{60}$	35.00	3.25	6.10	8.50	6.75	11.20	20.10
Azad P-3							
Control	31.80	3.10	5.82	8.12	6.05	9.80	19.40
$N_{20} + P_{40} + K_{20} + S_{10} + Ca_{20}$	35.34	3.22	6.08	8.63	6.88	11.55	20.28
$N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$	36.90	3.30	6.13	8.65	6.90	11.60	20.29
$N_{80} + P_{80} + K_{60} + S_{30} + Ca_{60}$	34.55	3.21	6.10	8.40	6.30	10.85	20.00

Table 2. Effect of various levels of nutrients combination on kernel yield of vegetable pea cultivars (q/ha)

Levels of nutrients combination	Varieties			
	Arkel	Azad P-1	Azad P-3	Mean
		1st year		
Control	5.50	9.84	8.34	7.89
$N_{20} + P_{40} + K_{20} + S_{10} + Ca_{20}$	9.17	12.42	11.09	10.89
$N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$	10.84	14.92	13.84	13.20
$N_{80} + P_{80} + K_{60} + S_{30} + Ca_{60}$	6.08	9.92	9.84	8.61
Mean	7.89	11.77	10.77	10.14
Factors	**Varieties**	**Nutrients**	**Vx N**	
S.E. m±	0.56	0.65	1.12	
C.D. 5%	1.16	1.34	N.S.	
C.V. (%)	18.32	-	-	
		2nd year		
Control	7.92	10.70	3.75	7.45
$N_{20} + P_{40} + K_{20} + S_{10} + Ca_{20}$	10.14	12.92	7.22	10.09
$N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$	13.20	15.42	10.42	13.01
$N_{80} + P_{80} + K_{60} + S_{30} + Ca_{60}$	8.75	11.12	6.11	8.66
Mean	10.00	12.54	6.87	9.80
Factors	**Varieties**	**Nutrients**	**Vx N**	
S.E. m±	0.56	0.64	1.12	
C.D. 5%	1.16	1.32	N.S.	
C.V. (%)	18.94	-	-	

Cultivars *Arkel* and *Azad P-3* gave statistically at par yield under denuded edaphic condition. The cultivar *Azad P-1* increased pods/plant, kernels/pod, kernels weight/plant and 100-kernel weight, which culminated into increase in dry kernel yield (q/ha) as compared to other two varieties. Similar observations have also been reported by Singh *et al.* (2011) and Singh *et al.* (2015). Application of $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha significantly increased the dry kernel yield of vegetable pea (13.10 q/ha), thereafter, significant reduction was computed. Application of higher dose of $N_{80} + P_{80} + K_{60} + S_{30} + Ca_{60}$ kg/ha produced dry kernel yield by 8.63 q/ha, which was statistically at par to control (7.67 q/ha). Therefore, the installment of nutrients combination beyond $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha confined to the further progress in dry kernel yield.

The integrated use of $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha increased pods/plant, kernels/pod, kernels weight/plant and 100-kernel weight, which culminated into increase the kernel yield (q/ha). These results confirm the findings of Singh *et al.* (2010). The better combination of $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha maintained better source-sink relationship under degraded edaphic condition. In this situation, the dry matter or photosynthates produced by source organs translocated towards sink organ (economy part). The sowing of vegetable pea at this combination had higher pods/plant, it possessed higher sink capacity to utilized the photo assimilates translocated from source, resulted in, higher kernels weight/plant and 100-kernel weight and significantly higher dry kernels yield (q/ha). These results confirm the findings of Panwar *et al.* (1986), Shrivastava and Bharadwaj (1986), Pachpor and Shete (2010), Singh *et al.* (2015), Singh *et al.* (2015) and Singh *et al.* (2016).

Conclusion

On the basis of the results, the application of $N_{40} + P_{60} + K_{40} + S_{20} + Ca_{40}$ kg/ha may be preferred for higher dry kernel production of vegetable pea with cultivar *Azad P-1* under degraded edaphic condition of Uttar Pradesh. The farmers residing under this situation may be advocated for application of aforementioned dose of nutrients combination and variety.

REFERENCES

Datta, N.P., Khera, M.S. and Saini, T.R. 1962. A rapid colorimetric procedure for the determination of organic carbon in soils. *Journal of Indian Society of Soil Sciences,* 10: 67-74.

Gomez, K.A. and Gomez, A.A. 1984. Statistical procedures for agricultural research. *Johnwiley and Sons,* New York.

Olsen, S.R., Cole, C.V., Watanable, F.S. and Dean, L.A. 1954. Estimation of available phosphorus in soils by extraction with sodium bicarbonate *U.S.D.A. Circ.,* 939 (Washington) : 19.

Pachpor, N.S. and Shete, P.G. 2010. Source-sink relationship in soybean genotypes in summer season. *International Journal of Agricultural Sciences,* 6 (1) : 67-68.

Panwar, J.D.S., Shukla, D.S. and Sirohi, G.S. 1986. Growth and development aspect in relation to yield of mungbean. *Indian Journal of Plant Physiology,* 4: 312-315.

Piper, C.S. 1950. Soil and Plant Analysis. *Univ. Adelaide* Aust.

Shrivastava, J.P. and Bharadwaj, S.N. 1986. Contribution of different photosynthesizing organ to the pod in relation to source-sink interaction in field pea. *Indian Journal of Plant Physiology,* 4 : 262-265.

Singh. D.P., Prakash, H.G., Dabbas, M.R. and Singh, R.A. 2011. Response of vegetable pea (*Pisum sativum*) cultivars on riverine soils of U.P. *The Asian Journal of Horticulture*, 6(1): 259-260.

Singh, R.A., Singh, A., Singh, I.P. and Rai, R. 2015. Groundnut-wheat cropping system under different moisture management practices in hillocks watershed of Bundelkhand. *Journal of Research in Environment and Life Sciences*, 8(2) : 337-340.

Singh, R.A., Singh, H.K., Singh, P.V. and Sharma, V.K. 2010. Role of *Bacillus circulans* in scaling up of productivity of vegetable pea green pods. *Asian Science*, 5(1) : 12-14.

Singh, R.A., Singh, J., Pal, S.B. and Singh, R.K. 2016. Integrated nutrient management in companion cropping of field pea (*Pisum sativum*) and Indian mustard (*Brassica juncea*) in riverine eco-system of U.P. *Research in Environment and Life Sciences*, 9(10) : 1171-1174.

Singh, M.K., Singh, R.A., Khan, K. and Chandra, N. 2015. Response of different varieties of vegetable pea (*Pisum sativum*) on seed production under dry eco-system. *Research in Environment and Life Science*, 8(2) : 397-398.

Singh, T.A. 1971. A laboratory manual for soil fertility and fertilizer, *U.P. Agril. Univ. Pantnagar* (*Nainital*) : 71-74.

****