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Varietal trial of vegetable pea to induce the yield efficiency of Farmers of Lakhisarai district of Bihar

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Abstract

The study was made to access the yield economic performance of three varieties of vegetable pea at Lakhisarai district. The varieties taken under the consideration of the trial are local variety, Kashi Uday and Azad Pea – 3 & were sown in Rabi 2017-18. The experimental design taken as randomized block design in which there were three treatments and each treatment was replicated ten times. The experiment results that Azad Pea – 3 was high yielded as compared to Kashi Uday and economically more convenient however, yield of Kashi Uday was less as compared Azad Pea – 3 for the same coverage area. Thus the conclusion had been made for the economic return per unit yield of varieties. The result invokes that Azad Pea – 3 gives more net monetary return per unit yield therefore, Azad Pea-3 cultivar is likely to be recommended to the farmers in this region.

Keywords: Vegetable pea, yield, varieties

Introduction

Vegetable pea (*Pisum sativum*) of leguminosae family derived from Central Asia is a vegetable crop of short duration and cool season (Vavilov, 1928) [2]. The increase in the trend of the cultivated area of pea had been seen from 563×10^3 ha with production from 5703×10^3 MT (NHB, 2021). It is quick growing herb which contains an adequate amount of protein, amino-acids, vitamin A & C, calcium iron and phosphorous in different proportion depending upon the variety. Being a leguminous plant, it fixes atmospheric nitrogen results to enrich the nitrogen in the soil and also provide an effective soil cover to prevent from soil erosion. Negi *et al.* 2010 [9] found that the average decrease in 50-60kg/ha of nitrogen is supplemented through nitrogen fixing. Grain of the pea are the rich source of protein which is extensively served as vegetable and soups however, rest of the plant part is used as a fodder and are nutritious in nature. Earlier only round shaped pea for pulses were cultivated but in the modern researches the round, wrinkled or dimpled shaped pea is also cultivated. The increase in the sweetness in the round shape may cause exosmosis and thus change the shape and size of from round to wrinkle. North Indian states are the major growing states for the growing of pea of which Uttarakhand is the most emerging state for vegetable pea grower as they takes three crops in year (NHB, 2017). At early stage of plant growth the plants are tolerant to frost but in the later stages the flowers and plants are much affected thus affect the yield. Generally, the crop can be cultivated throughout the year but October is the prime time for cultivation of this crop. The best favorable temperature for the germination of this crop is 13-18 °C however it grows well from 5-22 °C depending upon the varieties. Due to rich contents of vitamin, protein, calcium, iron, phosphorous, sweetness of the newly developed varieties there is high demand of pea in the market. This high demand can only be increased by increasing the production and productivity by choosing high yielder or right kind of variety at a particular agro-climatic and agro-ecological centre. Thus, from the above facts the variety of pea at a specific locality also varies via physical, physiological and morphological structure which directly or indirectly influences the yield and its attributing character. Keeping in the mind from the farmers prospective, the present study was conducted as a varietal trial of pea in region of Bihar.

Materials and Methods

The field experiment for the investigation of the work was carried out in 2017-18 Rabi Season at lakhisarai, bihar in farmer’s farm under the jurisdiction of KVK Lakhisarai. The experimental site was located at saundhi village and gangasarai with its GPS parameter as 25.2394°N and 86.0249°E. The experiment was laid out in randomized block design with three replication and ten treatments (tabulated in table 1). The data were taken for the field for plant height, days to 50% of flowering, number of nodes per plant, pod length, days to maturity, seed per pod, number of primary branches, number of secondary branches and seed yield at different stage of the plant cycle. These collected had been analyzed for variance (ANOVA) using excel sheet. Apart from these CD, SEM and correlation matrix had also been calculated for the closest recommendation which is well tabulated in table 2 and 3. Crop with three different varieties were sown in first week of November and were harvested 50-55 days from sowing. Before sowing the physical condition of each plot were very well maintained by disc ploughing followed by one harrowing and the application of FYM @ 10-15 t/ha boosts the physical tilth of the experimental soil. Apart from these NPK were applied @ 50, 60 and 60 kg/ha using urea, DAP and MOP fertilizer respectively. Half dose of

nitrogen with full phosphorous and potassium were applied at the time of sowing while the remaining half were applied in two split i.e. one month after planting and before flowering. To increase the efficiency of nutrient the seeds were dual inoculated with Rhizobium culture using slurry @ 1kg/ha, culture, soil and water in the ratio of 1:1:4 (Bai 2014, Suri *et al*, 2012) [3, 14]. In the experiment seed rate of crop was taken @ 90-95kg/ha with proper inoculation. Proper weeding and plant protection measures had been taken under consideration if found necessary. The total area of the experimental plot was 10000 m² with each plot 1000m². Economically the experiment worth variable cost per hectare as farmers practice however the variation in the treatments mainly due to change in variety which requires corresponding cultural practice.

Results

Table 1: Description of the Treatments

S. No.	Treatment Number	Description of Treatments (Varieties taken under consideration)
	T ₁	Local Varieties which had been used by farmers from long
	T ₂	Kashi Uday
	T ₃	Azad Pea – 3

Table 2: Evaluation of varietal trial on yield and its attributes

Treatment Description	plant height (cm)	days to 50% of flowering	no of nodes per plant	pod length	days to maturity	seed per pod	no of primary branches	no of secondary branches	Yield (q/ha)
Local Variety (Farmers Practice)	49.2	52	6.5	7.2	82	6.8	1.6	11.3	6.53
Kashi Uday	57.15	48.05	7.72	9.35	86	7.03	2.6	13.57	7.56
Azad Pea – 3	61.2	36	7.2	8.6	90	7.6	1.92	12.8	8.18
SEM(±)	1.115	3.53	0.888	1.037	3.37	N.S.	0.274	0.828	0.037
CD (p = 5%)	3.34	1.179	0.296	0.346	1.125	0.273	0.091	0.276	0.111

Table 3: Description of Correlation Matrix

	Plant Height (cm)	Days to 50% flower	No. of nodes per plant	Pod Length	Days of Maturity	Seed per Plant	Number of Primary Branches	Number of Branches	Pod yield (q/ha)
Plant Height (cm)	1								
Days to 50 days flower	0.017	1							
No. of nodes per plant	0.717*	0.293	1						
Pod Length	0.788*	0.312	0.868*	1					
Days of Maturity	0.806*	0.113	0.67*	0.764*	1				
Seed/Plant	0.82*	0.261	0.698*	0.695*	0.719*	1			
Number of Primary Branches	0.711*	0.231	0.698*	0.72*	0.557*	0.638*	1		
Number of Branches	0.803*	0.36	0.696*	0.78*	0.865*	0.73*	0.688*	1	
Pod yield (q/ha)	0.691*	-0.592*	0.379*	0.435*	0.547*	0.384*	0.455*	0.382*	1

(*) significantly correlated at 5% level of significance

Table 4: Economics of Treatments

Treatment Description	Cost of cultivation (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	B:C ratio
Use of local variety	33343	65300	31957	1.95
Kashi uday	34243	75600	42257	2.20
Azad pea -3	34243	81800	47557	2.38

Discussion

The variance analysis (ANOVA) gives significant result in plant height, days to 50% of flowering, number of nodes per plant, pod length, days to maturity, number of primary branches, number of secondary branches and seed yield however seed per pod varies non-significantly as presented in the table – 2. The investigation implies that Kashi Uday gives best promising yield as compared to rest of the treatments. The plant height, days to 50% of flowering, number of nodes

per plant, pod length, days to maturity, number of primary branches, number of secondary branches and seed yield in Kashi Uday varies from 52.9-72.5cm, 28-42, 4.2-10.5, 4.5-12.1, 76-105, 5-10.7, 1.15-2.85/plant, 7.7-18.1/plant and 7.96-8.49q/ha with an average 57.15cm, 48.05, 7.72, 9.35, 86, 7.03, 2.6/plant, 13.57/plant and 7.56q/ha however in Azad Pea – 3 it varies from 47.95-68.65cm, 37.55-57, 4.72-9.82, 5.25-12.45, 74-95, 4.43-10.13, 1.19-3.5/plant, 9.77-19.17/plant and 7.21-7.84q/ha with an average 57.15cm, 48.05, 7.72, 9.35, 86, 7.03, 2.6/plant, 13.57/plant, 7.56q/ha The significant changes result to have significant effect on the maturity (Shah *et al*. 2016) [5]. The similar significance in the character was observed by Amjad and Anjum, 2002 [6].

Correlation

The correlation matrix had been calculated at 5% level of significance which is tabulated in table – 3.

Yield is the most promising factor for any crop at farmer's sight because it improves their socio-economic lives. The total yield of any crop associated with its yield attributes like plant height, days to 50% of flowering, number of nodes per plant, pod length, seed per pod, days to maturity, number of primary branches and number of secondary branches. Higher the yield attribute higher photosynthetic rate produces high yield (Amjad and Anjum, 2002; Makasheva, 1983; Muehlbauer and McPhee, 1997) [6-8]. Yield of the crop was positively correlated with various yield attributing characters viz plant height, number of nodes per plant, pod length, seed per pod, days to maturity, number of primary branches and number of secondary branches having coefficient $r = .691, 0.379, 0.435, 0.547, 0.384, 0.455$ and 0.382 respectively however, yield was negatively correlated with days to 50% flowering with $r = -0.592$.

Economics

Economics of the treated plot is well tabulated in table – 4. The net cost of the treated plot was Rs 34243 per hectare however the maximum cost of cultivation was required in treatment TO3. The fluctuation in the cost was mainly due to change in the variety which requires corresponding cultural practice. The highest gross return (Rs. 81800 per hectare) was found in Azad Pea – 3 which results net return Rs. 47557 per hectare and B:C ratio 2.38 however Kashi Uday monetary statistics results gross return of Rs. 75600 with net return Rs. 42257 and B:C ratio 2.20.

Conclusion

The experimental findings of varietal trial of vegetable pea to induce the yield efficiency of farmers of lakhisarai district of Bihar indicate that yield wise Azad pea -3 gives best result and net monetary return of Azad Pea – 3 was maximum than kashi uday Hence, the recommendation of Azad Pea – 3 would be the more suitable cultivar for vegetable pea at village gangasarai and soundhi village of lakhisarai district of Bihar which confirms the economical as well as practical feasible from farmer's corner.

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