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Varietal trial of vegetable pea to induce the yield efficiency of farmers of district Chandauli

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Abstract
The study was made to access the yield economic performance of three varieties of vegetable pea of district Chandauli. The varieties taken under the consideration of the trail are local variety, Kashi Uday and Azad Pea – 3 & were sown in Rabi 2019-20. The experimental design taken as randomized block design with three treatments and each treatment was replicated ten times. The experiment results that Kashi Uday was high yielded and economically superior as compared to Azad Pea – 3 and local variety for the same coverage area. The result invokes that Kashi Uday gives more net monitory return per unit and yield i.e. Rs/ha^{-1} 49300 as compared to Azad Pea – 3 i.e. Rs/ha^{-1} 43100. Therefore, Kashi Uday cultivar is likely to be recommended to the small-marginal farmers in this region.

Keywords: Vegetable pea, yield, varieties

Introduction
Vegetable pea (*Pisum Sativum*) of leguminoceae family derived from Central Asia is a vegetable crop of short duration and cool season (Vavilov, 1928) [8]. The increase in the trend of the cultivated area of pea had been seems from 177.7×10^3 ha to 530.5×10^3 ha with production from 851.6×10^3 mT to 5345×10^3 mT and productivity 4.8 mT/ha to 10.1 mT/ha in the last 2.5 decades. 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 and also provides an effective soil cover to prevent from soil erosion. Negi *et al.* 2010 found that the average decrease in 50-60 kg/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. Earlier only round shaped pea for pulses were cultivated but now days 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 Uttrakhand is the most emerging state for vegetable pea grower as they takes three crops in year. At early stage of growth the plants are tolerant to frost but in the later stages the flowers and plants are much affected thus affect the yield. Generally, crop can be cultivated throughout the year but October is the prime time for cultivation of this crop. The crop can grow in temperature 5-22 ºC but optimum results were found at 13-18 ºC. Due to high vitamin, protein, calcium, iron, phosphorous contents and more sweetness there is high demand of pea in the market which can only be increased by increasing the production and productivity by choosing right kind of variety at a particular agro-climatic and agro-ecological centre. 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 Saifpur region of district Chandauli.

Materials and Methods
The field experiment for the investigation of the work was carried out in 2019-20 Rabi Season at farmer's farm under the jurisdiction of KVK Chandauli. The experimental site was located at Saifpur and its neighboring villages. The experiment was laid out in randomized block design with three replication and ten treatments (tabulated in table 1). The data were taken from the field for plant height, days to 50% of flowering, number of nodes per plant,

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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 this 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 fortnight October and were harvested 60-65 days from sowing i.e. last fortnight of November. 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. Along with this 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.* 2011) [2, 7]. In the experiment seed rate of crop was taken @ 90-95 kg/ha with proper inoculation. Proper weeding and plant protection measures had been taken under consideration if found necessary. The plantation geometry of the crop was kept 30×7 cm^2 in which row to row distance was 30 cm and 7 cm was plant to plant distance. Economically the experiment worth Rs. 3343 as fixed 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)
1	T1	Local Varieties which had been used by farmers from long
2	T2	Kashi Uday
3	T3	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 (/ha)
Local Variety (Farmers Practice)	50.2	53	7.5	8.2	83	7.8	2.6	12.3	7.53
Kashi Uday	62.2	37	8.2	9.6	91	8.6	2.95	13.8	9.18
Azad Pea – 3	58.15	49.05	8.72	10.35	87	8.03	3.6	14.57	8.56
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	40500	75300	34800	1.85
Kashi uday	42500	91800	49300	2.16
Azad pea -3	42500	85600	43100	2.01

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, seed per pod, number of primary branches, number of secondary branches and seed yield in Kashi Uday varies from 50.2-62.2 cm, 37-53, 7.5-8.72, 8.2-10.35, 83-91, 7.8-8.6, 2.6-3.6/plant, 12.3-14.7/plant and 7.53-9.18q/ha with an average 57.15 cm, 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 58.15cm, 49.05, 8.72, 10.35, 87, 8.03, 3.6/plant, 14.57/plant, 8.56q/ha The significant changes result to have significant effect on the maturity (Shah *et al*. 2016) [6]. The similar significance in the character was observed by Amjad and Anjum, 2002 [1].

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 status. 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) [1, 3, 4]. 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 = -0592.

Economics
Economics of the treated plot is well tabulated in table – 4. The net fix cost of the treated plot was Rs 40500 = 00 of Treatment 1 (local variety) and 42500 of rest other treatment per hectare. The highest gross return (Rs. 91800 per hectare) was found in Kashi uday which results net return Rs. 49300 per hectare and B:C ratio 2.16 however Azad pea -3 monetary statistics results Gross return of Rs. 85600 with net return Rs. 43100 and B:C ratio 2.01.

Conclusion
The experimental findings of varietal trial of vegetable pea to induce the yield efficiency indicates that yield and net monitory return wise Kashi Uday gives best result. Thus the conclusion when made on the basis of net monitory return and yield wise Kashi Uday is more prominent. Hence, the recommendation of Kashi uday variety more suitable cultivar for vegetable pea at village Kushi region of district Sonbhadra which confirms the economic as well as practical feasible from farmer's corner.

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