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Assessment of suitable Chilli varieties in alluvial plain of North Bihar region for higher productivity

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Abstract

A field study was conducted to assess the suitability of Chili varieties in zaid season in North-East alluvial plain of North Bihar region during 2013-14 and 2014-15. To test the different growth behaviors and their impact on fresh fruit yield of chilli. There were two promising varieties with local one called 'Desi' have been tested (i.e. Pant C-1, Kashi Anmol, and Local) on different growth parameters i.e. plant height, days to 50% flowering, days to maturity, days to first harvest and fresh fruit yield. Two years data indicated that maximum yield was obtained with Kashi Anmol i.e. 84.75 q/ha and 83.09q/ha followed by Pant C-1 i.e. 62.49 q/ha and 62.56 q/ha in both the respective years. The significant increase in yield to the extent of 85.12% in addition to better and attractive fruit quality was also observed with comparison of Desi and Kashi Anmol. The plant height is observed moderately in Kashi Anmol i.e. 42.26cm and 40.35cm compare to Desi i.e. 49.99cm and 48.77cm in both the years, respectively. Days to 50% flowering, days to maturity and date of first harvest had no significant variation found in both the years of study.

Keywords: Economics pant C -1, Kashi Anmol, chilli, growth, yield

Introduction

Chilli (*Capsicum annum* L.) is the most commercially grown on large scale as well as universal spice of India belong to solanaceae family. It is an important spice crop occupies an area of 8.34 lakh hectare in India with production of 8.47 lakh tones. Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu and West Bengal are leading chilli producing states in India (Anonymous 2007) [1]. The reasons for low yield in chilli are less coverage of high yielding varieties, heavy incidence of pest and diseases and lack of adoption scientific packages of practices (Indira, *et al.*, 2001) [6]. The main aim of Krishi Vigyan Kendra is to reduce the time loss between generation of technology at the research institution and its transfer to the farmers for increasing productivity and income from the agriculture and allied sectors on sustained basis Krishi Vigyan Kendras (KVKs) are grass root level organizations meant for application of technology through assessment, refinement and demonstration of proven technologies under micro farming situation in a district (Das, 2007) [4]. The On Farm Trial (OFT) is a long term educational activity conducted in a systematic manner in farmers fields to worth a new technology. Farmers in India are still producing crop based on the knowledge transmitted to them by their fore fathers leading to a grossly unscientific agronomic nutrient management and pest management practices. As a result of these, they often fail to achieve the desired potential yield of various crops and new varieties. Keeping in view the constraints Krishi Vigyan Kendra, Purnea, Bihar conducted On Farm Trial (OFT) on chilli which would ensure livelihood, nutritional security and economic empowerment of the farmers.

Materials and Methods

The present study was carried out by the Krishi Vigyan Kendra, Purnea, Bihar during kharif season from 2013-14 to 2014-15 in the farmers field of four villages with five replications and three treatments at Randomized Block Design (RBD) with a spacing of 60x45 cm. The soil of experimental field was sandy to sandy loam in texture, low available N, P₂O₅ and high in K₂O with acidic in reaction. The treatments included farmers practices (T₁) i.e. use of local varieties or self produce, (T₂)-recommended practice i.e improved variety of chilli, Pant Chilli -1 and recommended practice (T₃) i.e. improved variety of chilli Kashi Anmol. The recommended package of practices given by Bihar Agricultural University, Sabour, Bhagalpur, Bihar was

followed during conducting the On Farm Trial (OFT). The data recorded on average plant height (cm), number of branches per plant, days to 50% flowering, days to maturity and fresh fruit yield (q/ha), under all the treatments. The cost of cultivation and gross returns were worked out by using prevailing market prices of inputs during the period of investigation. Benefit- Cost ratio (BCR) was worked out by using the following formula- Benefit: Cost ratio (BCR) = Gross return (Rs./ha) / total cost of cultivation (Rs./ha).

Results and Discussion:-

Growth, development and productivity of any crop largely depend on the interaction between the plant genetics and the environmental conditions under which they are grown. The plant height represents the extension of primary growth and constitutes an important component of plant structure. The data pertaining to mean height of plant in chilli varieties under study at different growth stage is presented in Table-1. It was evident from the data that plant height differed significantly in chilli varieties at various growth stages. Significant variation in the plant height was observed among chilli genotypes at final stage of harvesting.

The maximum plant height was observed in the variety 'Desi' (49.37cm) followed by 'Kashi Anmol' (41.30 cm) and minimum was recorded in the 'Pant C-1' (36.49cm). The variety 'Desi' was significantly superior among other genotypes. The difference observed in the plant height of the different varieties could be attributed to their genotypic characteristics. This may be due to difference in the genetic makeup, environmental and soil properties of the North-east alluvial plain of North Bihar region. These results are in accordance with the finding of (Smitha and Basavaraja 2006; Tembhumne *et al.* 2008) [8, 9].

The data recorded on number of branches produced per plant at last harvest in all the varieties are presented in Table-1. It was observed that the number of branches produced per plant varied significantly in chilli genotypes during last harvest. The genotype at last harvest stage produced maximum branches in V₂ 'Kashi Anmol' (8.56) followed by V₁ 'Pant C-1' (7.33) and minimum number of branches per plant were produced in V₃ 'Desi' (6.35). The treatment V₂ was significantly superior to all the treatment. Such variation in the number of branches per plant may be due to characteristics of genotypes, interaction with environment and soil factors. These results are conformity with the finding of (Amit *et al.* 2014; Ukkud *et al.* 2007) [2, 10].

The data pertaining to the number of days to 50% flowering are presented in Table-1. It was noticed that the genotype V₂ 'Kashi Anmol' required minimum days (39.20) followed by V₁ 'Pant C-1' (43.87) and maximum days V₃ 'Desi' (45.30) days. The treatment V₂ was significantly superior to all the treatments. The variation of the days to 50% flowering may be due to genetic makeup of genotypes, less environmental, and vigour of growth of crop. Similar results were also observed by (Chattopadhyay 2011; Vijaya *et al.* 2014) [3, 11].

The data pertaining to the number of days to maturity of fruit is presented in Table-1. The minimum number of days to maturity of fruits was observed in treatment V₂ 'Kashi Anmol' (108.78) followed by V₁ 'Pant C-1' (112.19), and maximum number of days in V₃ 'Desi' (114.19). The treatment V₂ 'Kashi Anmol' was significantly superior to all the treatments. The variation of the days to maturity may be due to genetic influence of genotypes, environment and their interaction effect on overall growth and maturity of crop. (Amit *et al.* 2014) [2] also reported similar results on chilli genotypes.

Data pertaining to the total fresh fruit yield is presented in Table-1. The higher fresh fruit yield was observed with V₂ 'Kashi Anmol' (82.75 q/ha) followed by V₁ 'Pant C-1' (62.52 q/ha) and lowest yield was recorded with V₃ 'Desi' (44.70 q/ha). The treatment V₂ 'Kashi Anmol' was significantly superior to all the treatments. The variation of the fresh fruit yield may be due to environmental condition aggregate of all external conditions which influence growth and development of plants and also the genetic behaviour of genotypes which has less influenced by weather condition of North-east alluvial plain of North Bihar region. These results are in close conformity to (Mahmood *et al.* 2002; Dhamanthi and Reddy 2003) [7, 5].

Farm income and sustainability are very important in research and developmental project, particularly when the project intervenes with improved varieties and technological packaged. In this study the income of farmer were analysed by comparing productivity of different chilli varieties in North-east alluvial plain of North Bihar region. Data were compiled on basis of fresh fruit production during 2013-14 and 2014-15. The result shows that farmers can get almost doubled yield i.e.82.75 q/ha (85.12% increase) by adopting improved variety 'Kashi Anmol' as compare to local. The comparative study of cost of cultivation, gross return, net return and benefit cost ratio displayed in Table-2.

Table 1: Performance of different Varieties on morphological characters of Chilli (*Capsicum annum. L*)

Treatment	Plant Height (cm.)	Number of branches / plant	Days to 50% Flowering	Days to Maturity	Total Fresh Fruit Yield(q/ha)
Pant C-1	41.30	7.33	43.87	112.19	62.52
Kashi Anmol	36.49	8.56	39.20	108.78	82.75
Local	49.37	6.35	45.30	114.19	44.70
C.D. (P=0.05)	4.05	0.45	2.44	2.65	2.44
SE (m)	1.22	0.13	0.73	0.80	0.73
SE (d)	1.73	0.19	1.04	1.13	1.04

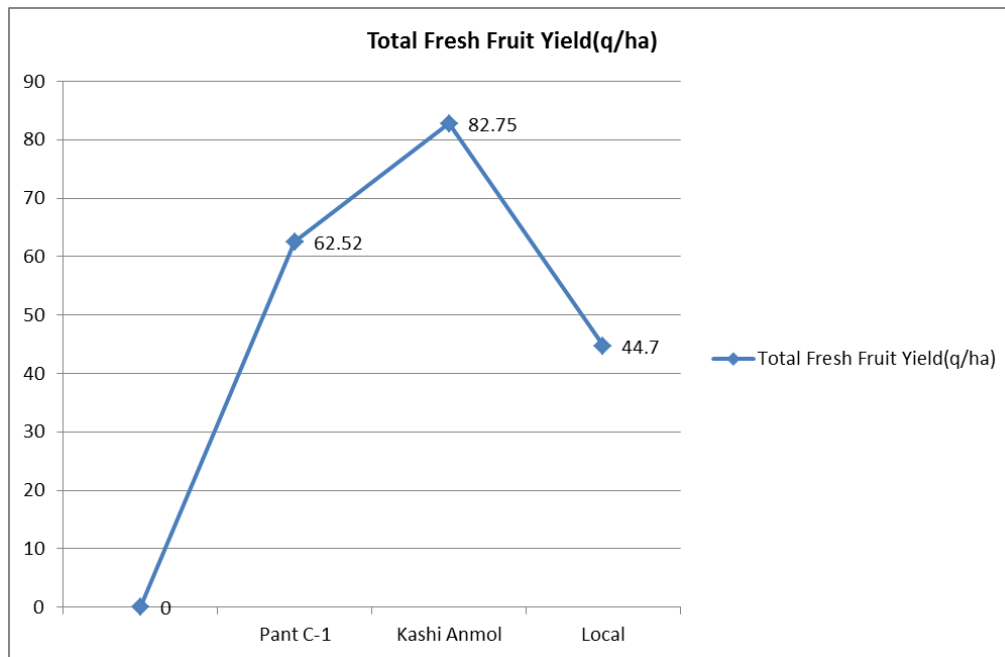


Fig. 1: Yield performance of different variety of chilli (*Capsicum annum. L*)

Table 2: Economic returns from different variety of chilli (*Capsicum annum. L*)

Treatments	Cost of cultivation (Rs/ha)		Gross return(Rs/ha)		Net return (Rs/ha)		B:C ratio	
	2013-14	2014-15	2013-14	2014-15	2013-14	2014-15	2013-14	2014-15
T ₁ : Farmers practices	35,915	36,500	82,080	78,840	46,165	42,340	2.28	2.16
T ₂ : Pant Chilli -1	38,500	39,500	112,482	112,608	73,982	73,108	2.92	2.85
T ₃ : Kashi Anmol	38,500	39,500	148,374	149,562	109,874	110,062	3.85	3.87

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