



PERFORMANCE OF TWO BRINJAL VARIETIES UNDER OPEN FIELD AND NATURALLY VENTILATED POLYHOUSE CONDITIONS IN COLD DESERT REGION OF HIMACHAL PRADESH, INDIA

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Abstract

The present study was carried out with two brinjal varieties Pusa Purple Long and Pusa Purple Cluster to evaluate their performance and suitability under open and naturally ventilated polyhouse conditions in cold desert region of Himachal Pradesh, India. Growing conditions had significant influence on parameters like days to marketable maturity, harvest duration, plant height, number of fruits per plant, fruit yield per plant and fruit yield per ha. Number of fruits per plant and fruit yield per ha were 16.02 and 31.87%, respectively higher under naturally protected condition in comparison to open field. Pusa Purple Long was significantly early to reach marketable maturity and also recorded the highest value for harvest duration.

Key words : Brinjal, cold desert, open field, naturally ventilated polyhouse.

Introduction

Brinjal (*Solanum melongena* L.) is one of the most important vegetables grown in almost all parts of the country except higher altitude. It is very popular among the people of all social strata hence, it is rightly called as vegetable of the masses (Choudhary and Kalda, 1968). In hilly regions of cold desert area of Spiti, its cultivation is only confined to lower elevation of around 3200 m above msl on limited scale for domestic use only. Cultivation of crops other than traditional crop like peas and naked barley in the region offers opportunity to the farmers for crop diversification. Besides crop diversification, it can also serve as new source of income in the region. Commercial cultivation of brinjal is hampered in the region due to its susceptibility to frost and low night temperature. Protected structure offers an opportunity for extended period of cultivation under frost free and comparatively higher night temperature conditions. Therefore, an effort has been made to study the performance of two brinjal varieties in two growing conditions *viz.* open field and naturally ventilated polyhouse conditions in cold desert region of Himachal Pradesh.

Materials and Methods

The experiment was carried out at Regional Horticultural Research Sub Station, Dr. Y. S. Parmar University of Horticulture and Forestry, Tabo, Spiti (H.P.), India; situated at 78° 23' 19" N latitude and 32° 05' 68" E longitude with a mean altitude of 3285 m AMSL. The experiment comprised of two factors; (A) two growing conditions *viz.* open field (G1) and naturally ventilated polyhouse (G2) and (B) two brinjal varieties *viz.* Pusa Purple Long (V1) and Pusa Purple Cluster (V2) following a Factorial Randomized Complete Block Design with three replications. Two months old healthy seedlings were transplanted in the open field as well as naturally ventilated polyhouse at a spacing of 60 cm × 45 cm and plot size of 4 m². Observations on parameters like days to marketable maturity, harvest duration, average fruit weight, number of fruits per plant, fruit yield per plant fruit yield per ha and plant height were recorded. Standard agronomic practices were followed to raise the crop.

Results and Discussion

Among individual effect, growing conditions had significant effect on all the parameters except fruit weight. However, significant varietal differences were observed only for days to marketable maturity, harvest duration,

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Table 1 : Main effect of growing conditions and varieties on different parameters.

Treatments	Days to marketable maturity (days)	Harvest duration (days)	Average fruit weight (g)	No of fruits per plant	Fruit yield per plant (g)	Fruit yield per ha (MT/ha)	Plant height (cm)
Grow Cond.							
G1	127.88	32.16	53.37	9.02	476.35	17.63	47.49
G2	116.16	45.67	58.68	10.79	630.82	23.25	53.00
CD(0.05)	1.01	1.64	NS	0.49	59.74	2.21	2.51
Var.							
V1	116.22	42.83	53.09	10.88	580.38	21.49	47.43
V2	127.83	35.00	58.91	8.93	526.79	19.50	53.00
CD(0.05)	1.01	1.64	NS	0.49	NS	NS	2.51

G1 = Open field condition, G2 = Protected conditions, V1 = PPL, V2 = PPC.

Table 2 : Interaction effect of growing conditions and varieties on different parameters.

Treatments	Days to marketable maturity (days)		Harvest duration (days)		Average fruit weight (g)		No. of fruits per plant		Fruit yield per plant (g)		Fruit yield per ha (MT/ha)		Plant height (cm)	
Var.														
Grow Cond.	V1	V2	V1	V2	V1	V2	V1	V2	V1	V2	V1	V2	V1	V2
G1	122.44	133.33	37.66	26.67	49.56	57.17	9.93	8.11	491.82	460.88	18.21	17.06	44.54	50.44
G2	110.00	122.33	48.00	43.33	56.62	60.65	11.83	9.75	668.95	592.7	24.77	21.94	50.33	55.67
CD(0.05)	NS	2.32	NS	NS	NS	NS	NS							

G1 = Open field condition, G2 = Protected conditions, V1 = PPL, V2 = PPC.

number of fruits per plant and plant height (table 1). Under protected structure, it was 11.72 days earlier to open field conditions to reach the marketable maturity. It may be due to more congenial environment inside the protected structures. Similar result of earlier maturity under protected structures in comparison to open field in tomato was reported by Parvej *et al.* (2010). Pusa Purple Long was the earliest to reach the marketable maturity. Maximum harvest duration of 45.67 days was recorded under protected conditions. Prolonged harvest duration inside protected structure may be due to early maturity and frost free conditions inside protected structures during October-November months. Crop under open field conditions were affected by the frost during autumn season. Between varieties, Pusa Purple Long recorded the highest value of 42.83 days for harvest duration. Similar results were found for number of fruits per plant for individual effects. There was 19.62% higher no of fruits per plant under protected condition in comparison to open field condition. Fruit yield per plant and ha was significantly higher under protected conditions.

Significantly higher fruit yield in the plants grown under polyhouse condition over the plants grown in open space was associated with the production of higher number of fruits and prolonged harvest duration than those in the open field. Higher values of all the yield and yield components of brinjal crop grown under polyhouse than open field was may be due to the taller plants having much number of branches with greater LAI attributed by warmer temperature and the results are in agreement with Kanthaswamy *et al.* (2000), Nagalakshmi *et al.* (2001), Saikia *et al.* (2001), Mishra *et al.* (2003) and Cheema *et al.* (2004). However, varietal differences were found non significant for yield. Plant height was higher under protected conditions and variety Pusa Purple Cluster recorded the maximum plant height of 53 cm. Morphological development like plant height may be positively favoured due to the warmer environment inside the polyhouse. Similar findings inside polyhouse were also reported by Pandey *et al.* (2004). Interaction effect was found significant only for harvest duration only and variety Pusa Purple Long under protected condition recorded

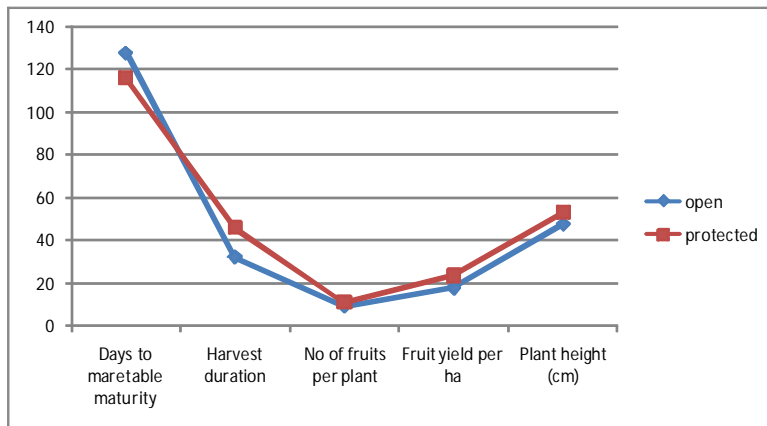


Fig. 1 : Line diagram on performance of brinjal under open and protected growing conditions.

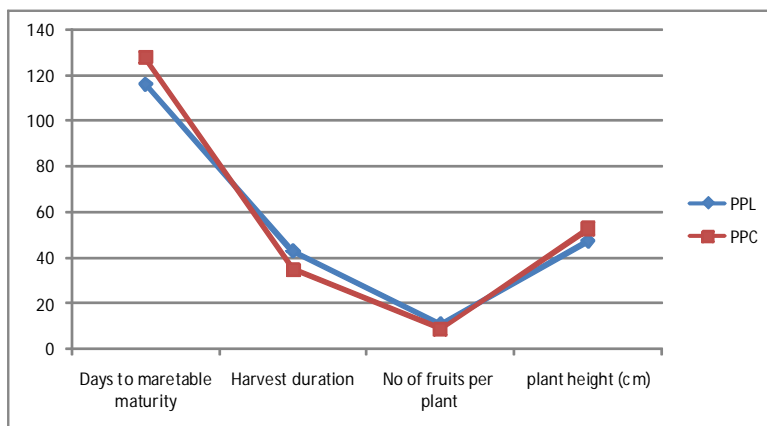


Fig. 2 : Line diagram on performance of two brinjal varieties.

the highest value of 48.00 for harvest duration. Harvest duration was affected by frost occurrence in the later stages of crop period. The lower minimum temperature levels reduced or delayed the fruiting process of brinjal and it might create problems for the vegetative and generative growth (Abak and Guler, 1994).

It is concluded that the early maturity, better growth and high yield and yield contributing characters of brinjal were achieved under polyhouse due to the higher (optimum) temperature during the autumn months (October to November), which positively influenced the morphological and physiological events of plants. The growth and development of brinjal plant is restricted during the colder period because of its season bound nature.

Therefore, if brinjal is planted under polyhouse, it will establish good stands that mature earlier. The optimum temperature accompanied by CO₂ enrichment inside polyhouse hasten crop development and early maturity, so growers can be benefited by being able to produce brinjal which fetch premium prices in the market.

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