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### Performance of cauliflower varieties under different spacings in Chhattisgarh plain

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#### Abstract

The present investigation entitled “Performance of Cauliflower varieties under different spacings in Chhattisgarh plain” was carried out in Horticulture Research Farm of Barrister Thakur Chhedilal College of Agriculture with the aim of investigate to performance of different cauliflower varieties under different spacing. The experiment had two factors Factor A: Plant spacing ( $S_1$ :60x30 cm,  $S_2$ :60x45 cm,  $S_3$ :60x60 cm) and Factor B: Varieties ( $V_1$ : Welcome Kartiki,  $V_2$ : Welcome Kartiki Pusa Dipali,  $V_3$ : Sitara,  $V_4$ : Karishma plus). The experiment was laid out in Factorial RBD with 3 replications and 12 treatment combinations. Maximum diameter of curd (9.34cm), fresh weight (818.57g) and dry weight of curd (72.09g) observed in  $V_2$ . Among spacing maximum diameter of curd(9.07cm), fresh weight (731.51g) and dry weight (82.93g)of curd observed in  $S_3$ .Maximum total curd yield (194.35q ha<sup>-1</sup>) gross income(291528.00 Rs ha<sup>-1</sup>),net income (230582.00 Rs ha<sup>-1</sup>), B:C ratio (3.78) was found in spacing  $S_2$ (60x45cm) and among varieties highest total curd yield (194q ha<sup>-1</sup>) gross income (292525.00 Rs ha<sup>-1</sup>), net income (233183.00 Rs ha<sup>-1</sup>), B:C ratio (3.9) was found  $V_2$ (Welcome Kartiki Pusa Dipali).

**Keywords:** variety, spacing, cauliflower, curd yield, diameter of curd

#### Introduction

Cauliflower (*Brassica oleraceavar botrytis* L.) is an important cole crop in the world originated from a single plant wild cliff-cabbage (*Brassica oleracea* var. *sylvestris*) in Mediterranean region. The name cauliflower has originated from the Latin words ‘Caulis’ meaning stem and ‘Florish’ meaning flower. Dr. Jemson at Saharanpur first introduced it to India in 1822 during the period of East India Company. Cauliflower follows cabbage in importance with regard to area and production in the world.

Cauliflower contain 92.7 % water and the food value per 100 g of edible portion is as follows: energy 31 calories, protein 2.4 g, calcium 22 mg, vitamin A 40 IU, ascorbic acid 70 mg, thiamine 0.2 mg, riboflavin 0.1 mg and niacin 0.75 mg. It contains glucocinolates which in crushed leaves is broken down by myrosinase enzyme to give better taste and goitrogenic substance.

India is the second largest producer of cauliflower in the world and occupies 452.1(000’ha) area with a production of 8498.9 (000 MT) and productivity of 18.8 (MT ha<sup>-1</sup>) (Anonymous, 2017). In Chhattisgarh major cauliflower producing districts are Durg, Surguja, Balod, Surajpur, Bemetara, Korba, Kanker, Bilaspur with highest production rate in Kondagaon (Horticultural statistics at a glance, 2017). In Chhattisgarh total cultivated area is 23.95(’000ha), with production 453.9 (000 MT) (Anonymous, 2017)

Cauliflower varieties are classified based on optimum temperature for curd initiation and availability period viz, early (20-27<sup>0</sup> C and September-October), mid-early

(20-25<sup>0</sup> C and October-November), mid-late (16-18<sup>0</sup> C and November-December), and late (12-16<sup>0</sup> C and December-January) even there are sub groups within each group. The optimum average temperature for curd formation is 17 °C and the early cultivars or lines form curds at 20-25 °C and late cultivars or lines form at around 10 °C.

Availability of suitable high yielding variety and optimum plant spacing may help the farmers to achieve more returns per unit area and also for efficient absorption of nutrients and trapping of solar energy (Bhangre *et al.* 2011) [3].

#### Material and Methods

The experiment was conducted at the Horticultural Research Farm of Barrister Thakur Chhedilal College of Agriculture and Research Station, Bilaspur (Chhattisgarh) during *post kharif* season 2019-20. The experiment was laid out in Factorial randomized block design (RBD) with three replication and 12 treatment combinations shown in table 1. The cauliflower crop is transplanted in the plot size of 17.28 m<sup>2</sup>.The observations on yield parameters viz., Diameter of curd(cm), fresh weight of curd (g) and dry weight of curd (g) curd yield(q ha<sup>-1</sup>)was recorded on five randomly selected plants from each plot at the time of harvesting of curd and the mean was calculated. The economics of different treatments has also been worked out. The data recorded from various observations in the field as well as laboratory were subjected to statistical analysis by standard analysis of variance technique panse and sukhamte (1985).

## Treatment details

Table 1

S.no.	Spacings (S)	Varieties (V)	Treatment combinations
1.	60x30cm (S <sub>1</sub> )	Welcome kartiki (V <sub>1</sub> )	S <sub>1</sub> V <sub>1</sub>
		Fulgobhi kartiki pusa dipali (V <sub>2</sub> )	S <sub>1</sub> V <sub>2</sub>
		Sitara (V <sub>3</sub> )	S <sub>1</sub> V <sub>3</sub>
		Karishma plus (V <sub>4</sub> )	S <sub>1</sub> V <sub>4</sub>
2.	60x45cm (S <sub>2</sub> )	Welcome kartiki (V <sub>1</sub> )	S <sub>2</sub> V <sub>1</sub>
		Fulgobhi kartiki Pusa dipali (V <sub>2</sub> )	S <sub>2</sub> V <sub>2</sub>
		Sitara (V <sub>3</sub> )	S <sub>2</sub> V <sub>3</sub>
		Karishma plus (V <sub>4</sub> )	S <sub>2</sub> V <sub>4</sub>
3.	60x60cm (S <sub>3</sub> )	Welcome kartiki (V <sub>1</sub> )	S <sub>3</sub> V <sub>1</sub>
		Fulgobhi kartiki pusa dipali (V <sub>2</sub> )	S <sub>3</sub> V <sub>2</sub>
		Sitara (V <sub>3</sub> )	S <sub>3</sub> V <sub>3</sub>
		Karishma plus (V <sub>4</sub> )	S <sub>3</sub> V <sub>4</sub>

## Result and discussion

The experimental findings indicated that the maximum diameter of curd (9.34cm) recorded of variety V<sub>2</sub> (welcome kartiki pusa dipali). It was followed by V<sub>1</sub> and V<sub>3</sub> with non-significance different. Minimum diameter of curd observed in variety V<sub>4</sub> (karishma plus). Among the plant spacing, maximum diameter of curd recorded with plant spacing S<sub>3</sub> (60x30 cm). Maximum diameter of curd (9.07cm) recorded in S<sub>1</sub> (60x60 cm). Maximum Fresh weight curd (818.57g) recorded of variety V<sub>2</sub> (welcome kartiki pusa dipali). It was followed by V<sub>1</sub> and V<sub>3</sub>. Minimum weight of curd observed in variety V<sub>4</sub> (karishma plus). Maximum fresh weight of curd (731.51g) recorded with plant spacing S<sub>3</sub> (60x60 cm). Minimum weight of curd recorded in S<sub>3</sub> (60x30 cm). Maximum dry weight curd recorded of variety V<sub>2</sub> (welcome kartiki pusa dipali). It was followed by V<sub>1</sub> and V<sub>3</sub> with non-significance different. Minimum dry weight of curd observed in variety V<sub>4</sub> (karishma plus) among the plant spacing, maximum dry weight of curd (82.93g) recorded with plant spacing S<sub>3</sub>

(60x60 cm). Minimum dry weight of curd recorded in S<sub>1</sub> (60 x 30 cm). Maximum total curd yield (195q ha<sup>-1</sup>) recorded of variety V<sub>2</sub> (welcome kartiki pusa dipali). It was followed by V<sub>1</sub> and V<sub>3</sub>. Minimum total curd yield observed in variety V<sub>4</sub> (karishma plus) among the plant spacing, highest total curd yield (194.35q ha<sup>-1</sup>) recorded with plant spacing S<sub>2</sub> (60x45 cm). Minimum recorded in S<sub>1</sub> (60x60 cm).

Economics of the treatments Variety V<sub>2</sub> (welcome kartiki pusa dipali) resulted in maximum gross income (2,92,525 Rs.ha<sup>-1</sup>), net income (2,33,183Rs./ha) and B:C ratio (3.9) which was followed by V<sub>1</sub> (welcome kartiki) and V<sub>3</sub> (sitara) with at par performance. Minimum gross income (1, 97,715Rs/ha), net income (1, 59,136Rs.ha<sup>-1</sup>) and B: C ratio (2.4) were realized with variety V<sub>4</sub> (karishma plus). Maximum gross (2,91,528 Rs.ha<sup>-1</sup>) income net income (2,30,528Rs.ha<sup>-1</sup>) and B:C ratio (3.7) were observed in plant spacing S<sub>2</sub> (60x45 cm). It was significantly superior over spacing S<sub>3</sub> (60x60 cm).

Table 2: Effect of Plant spacing, varieties on Diameter of curd (cm) in cauliflower

Treatments	Diameter of curd(cm)
Spacing(S)	
S <sub>1</sub>	8.00
S <sub>2</sub>	8.31
S <sub>3</sub>	9.07
SEm±	0.07
CD	0.21
Varieties(V)	
V <sub>1</sub>	8.56
V <sub>2</sub>	9.34
V <sub>3</sub>	8.52
V <sub>4</sub>	7.42
SEm±	0.08
CD	0.25
Interaction(SXV)	
SEm±	0.15
CD	NS

**Table 3:** Effect of Plant spacing, varieties on Curd fresh weight of curd (g) in cauliflower

Treatments	Weight of curd (g)
Spacing(S)	
S <sub>1</sub>	497.90
S <sub>2</sub>	589.16
S <sub>3</sub>	731.51
SEm±	5.10
CD%	14.78
Varieties(V)	
V <sub>1</sub>	576.80
V <sub>2</sub>	818.57
V <sub>3</sub>	580.87
V <sub>4</sub>	448.53
SEm±	5.89
CD	17.07
Interaction(SXV)	
SEm±	10.21
CD	NS

**Table 4:** Effect of Plant spacing, varieties on dry weight of curd (g) in cauliflower

Treatments	Dry weight of curd (g)
Spacing(S)	
S <sub>1</sub>	54.55
S <sub>2</sub>	68.99
S <sub>3</sub>	82.93
SEm±	0.30
CD	0.88
Varieties(V)	
V <sub>1</sub>	69.22
V <sub>2</sub>	72.09
V <sub>3</sub>	69.30
V <sub>4</sub>	64.31
SEm±	0.35
CD	1.025
Interaction (SXV)	
SEm±	0.61
CD	NS

**Table 5:** Effect of Plant spacing, varieties on Curd Yield (q ha<sup>-1</sup>) of cauliflower

Treatments	Curd Yield(q ha <sup>-1</sup> )
Spacing(S)	
S <sub>1</sub>	169.41
S <sub>2</sub>	194.35
S <sub>3</sub>	151.62
SEm±	9.38
CD%	27.16
Varieties(V)	
V <sub>1</sub>	171.14
V <sub>2</sub>	195.02
V <sub>3</sub>	172.40
V <sub>4</sub>	148.60
SEm±	10.83
CD%	31.37
Interaction(SXV)	
SEm±	8.10
CD%	NS

**Table 6:** Economics of treatments

Treatment	Economics of different treatments		
	Gross income (Rs.ha <sup>-1</sup> )	Net income (Rs.ha <sup>-1</sup> )	B:C ratio
Spacing(S)			
S <sub>1</sub>	254111.00	193165.00	3.16
S <sub>2</sub>	291528.00	230582.00	3.78
S <sub>3</sub>	227426.00	166480.00	2.73
Varieties(V)			
V <sub>1</sub>	256715.00	194941.00	3.15
V <sub>2</sub>	292525.00	233183.00	3.9
V <sub>3</sub>	258605.00	199711.00	3.39
V <sub>4</sub>	197715.00	159136.00	2.4
Interaction(VXS)			
S <sub>1</sub> V <sub>1</sub>	256320.00	194546.00	3.14
S <sub>1</sub> V <sub>2</sub>	273255.00	213913.00	3.6
S <sub>1</sub> V <sub>3</sub>	259530.00	200636.00	3.4
S <sub>1</sub> V <sub>4</sub>	227340.00	163566.00	2.5
S <sub>2</sub> V <sub>1</sub>	287460.00	225686.00	3.6
S <sub>2</sub> V <sub>2</sub>	348060.00	288718.00	4.8
S <sub>2</sub> V <sub>3</sub>	286920.00	228026.00	3.8
S <sub>2</sub> V <sub>4</sub>	243675.00	179901.00	2.8
S <sub>3</sub> V <sub>1</sub>	226365.00	164591.00	2.6
S <sub>3</sub> V <sub>2</sub>	256260.00	196918.00	3.3
S <sub>3</sub> V <sub>3</sub>	229365.00	170471.00	2.8
S <sub>3</sub> V <sub>4</sub>	197715.00	133941.00	2.1

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