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Performance of cauliflower (*Brassica oleracea* var. *botrytis*) hybrid under the Vindhyan plateau of Madhya Pradesh

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Abstract

The experiment was laid out in Randomized Completely Block Design (RCBD) with three replications. Each replication consists of 10 treatments. All the treatments were randomized separately in each replication, based on current experiment, it is observed that the cauliflower hybrid Barkha and variety Versha responded well in terms of growth (such as stalk length, number of leaves plant-1 and leaf length) were recorded in hybrid barkha at both growth stages. Yield and yield attributing characters *viz.*, curd length, curd width, average curd weight, marketable curd yield plot-1 and marketable curd yield hectare-1 were also recorded in hybrid Barkha. These were identified as best hybrid and variety for cultivation in Vindhyan Plateau agro-climatic region of M.P.

Keywords: Cauliflower, hybrid, marketable yield, unmarketable yield and Vindhyan plateau

Introduction

Cauliflower (*Brassica oleracea* var. *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. Over the last two decades crops in the Brassicaceae (formerly Cruciferae) have been the focus of intense research based on their human health benefits (Traka and Mithen, 2009) [14].

Cauliflower fresh curd are highly nutritive and contain fibre (1.2 g), moisture (90.8 g), protein (2.6 g), carbohydrates (4.0 g), Ca (33 mg), P (57 mg), iron (1.5 mg), riboflavin (0.10 mg), carotene (30 mg), thiamine (0.04 mg), niacin (1.0 mg), vitamin-C (56 mg) 100⁻¹ gm of edible portion (Jood and Neelam 2011) [3].

Cauliflower is a highly thermo-sensitive crop requiring different genotypes for commercial cultivation at different periods of the year. Accordingly in Northern India, cauliflower is classified into four maturity groups, *viz.*, I –maturing from late August to early November, II - maturing from mid-November to early December, III - maturing from mid-December to early January and IV - maturing from mid-January to early March. First three groups are the Indian cauliflowers which are early maturing annual types, tolerant to high temperature and humid conditions and have originated from winter types like Cornish or by inter-crossing of Cornish and other European types. Maturity Group IV is called 'Snowball' varieties or the summer cauliflower of Europe and has been developed from Erfurts and Alpha types. The seeds of first three maturity groups can be freely raised in North Indian plains, such as Rajasthan, Uttar Pradesh, Bihar, Punjab, Haryana, and Delhi and in Southern states but the seeds of maturity group IV are raised only in the hills, like Solan and Kullu valley of Himachal Pradesh and Kashmir. Cultivars of cauliflower belonging to the mid-group do well in mid hills of Himachal Pradesh where these are grown commercially as an off season crop during summer-rainy season resulting in high economic returns to the farmers.

A lot of cauliflower hybrids/varieties are being grown by the farmers, but best performing hybrids/varieties of cauliflower having desirable quantitative and qualitative characters such as adaptability to adverse environments and resistance to biotic and a biotic stress resulting into better monetary return to the vegetable growers. Keeping in view, it is essential to work out on the appropriate quantitative and qualitative characters of cauliflower crop so that maximum yield and high-quality produce could be obtained. This is common fact that the genotypes showing better performance under one locality may not be suitable for another locality or region.

So that the main aim of experiment is to find out the better performance of a particular cauliflower hybrid/variety in Vindhyan plateau and screen out to which hybrid/variety well adopted and produced maximum yield to another variety under Vindhyan plateau.

Materials and Methods

The experiment was laid out in Randomized Completely Block Design (RCBD) with three replications. Each replication consists of 10 treatments. The present experiment was laid out in the field of the Horticulture Research Farm, Department of Horticulture, R.A.K. College of Agriculture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Sehore, during 2017-2018. The land topography of the experimental

site was almost uniform with an adequate surface drainage. The internal drainage of the experimental site is medium. Sehore is situated at the latitude of 27.05° East and an altitude of 497.8 meters above the mean sea level. It lies in the western track of Vindhyan Plateau agro-climatic zone of Madhya Pradesh and enjoy sub-tropical climate. The average annual rainfall is 1031 mm, which is mostly received during July and August. The average maximum temperature is 46°C and minimum temperature 6.8 °C. The average annual relative humidity is 74%.

The soil of the experimental field was clay loam Vertisol with 42.6% clay, 31.8% silt and 21.5% sand with pH ranging from 6.9. The soil was very low in available nitrogen, medium in available phosphorus and high in available potassium

Table 1: Details of treatments used in the study

S. No.	Treat. Symb.	Treatments	Sources
1.	T ₁	Barkha (Hy)	Seminis seed company
2.	T ₂	Girija (Hy)	Seminis seed company
3.	T ₃	Suhasini (Hy)	Syngenta seed company
4.	T ₄	White excel (Hy)	Suttons seed company
5.	T ₅	PS -666 (Hy)	Pahuja seed company
6.	T ₆	Versha	Dr. seed Pvt. Ltd
7.	T ₇	Sitara – 70	Ujjawala seed company
8.	T ₈	Early special	H.M. clause India Pvt. Ltd.
9.	T ₉	Ganga-60	Local
10.	T ₁₀	Nandani	Local

Results

Growth parameters

The evaluation of growth parameters *viz.*, average number of leaves plant⁻¹, stalk length and number of leaves at successive stages of growth (at 30 and 60 days after transplanting), depicted in Table: 2 and Fig. 1. The data clearly indicated that the growth stages of cauliflower plant responded significantly to various hybrids/ varieties at all the growth stages (30 and 60 days after transplanting), under study.

The stalk length was evaluated at 30 and 60 days after transplanting. At 30 and 60 days after transplanting, the maximum stalk length was recorded in hybrid Barkha (11.60

and 17.87 cm) followed by Girija (11.47 cm), variety Versha (11.0 cm) and Hy Suhasini (10.67 cm) while, the minimum stalk length (9.0 cm and 15.80cm) were observed in variety Sitara – 70. During the experiment, at the both growth stages the hybrid Barkha perform superior compare to other hybrid and varieties. The successive stages of growth like number of leaves and leaf length at 30 and 60 days after transplanting the hybrid Barkha (Hy) again found superior. maximum number of leaves plant⁻¹ were observed under hybrid Barkha (11.0 leaves and 20.33 leaves) followed by Girija variety Versha and Hy Suhasini whereas, the minimum leaves plant⁻¹ was observed in Sitara – 70.

Table 2: Evaluation of different hybrids of cauliflowers for growth parameters

Treatments	Stalk length (cm) at		Number of leaves/ plant		Leaf length (cm) at	
	30 DAT	60 DAT	30 DAT	60 DAT	30 DAT	60 DAT
Barkha (Hy)	11.60	17.87	11.00	20.33	17.78	28.45
Girija (Hy)	11.47	17.67	10.40	18.87	17.45	26.97
Suhasini (Hy)	10.67	17.37	10.00	18.07	16.67	25.83
White excel (Hy)	10.47	17.13	9.20	17.87	16.35	25.50
PS -666 (Hy)	9.80	16.13	7.40	16.33	14.70	24.65
Versha	11.00	17.47	10.27	18.40	16.85	26.43
Sitara – 70	9.00	15.80	6.60	15.73	14.45	24.15
Early special	10.00	16.73	7.47	16.87	14.95	24.95
Ganga-60	10.33	16.80	7.80	17.13	15.80	25.18
Nandani	10.40	17.00	8.40	17.20	15.98	25.38
S.Em±	0.36	0.22	0.58	0.64	0.69	0.54
C.D. (P 0.05) level	1.07	0.66	1.73	1.89	2.04	1.62

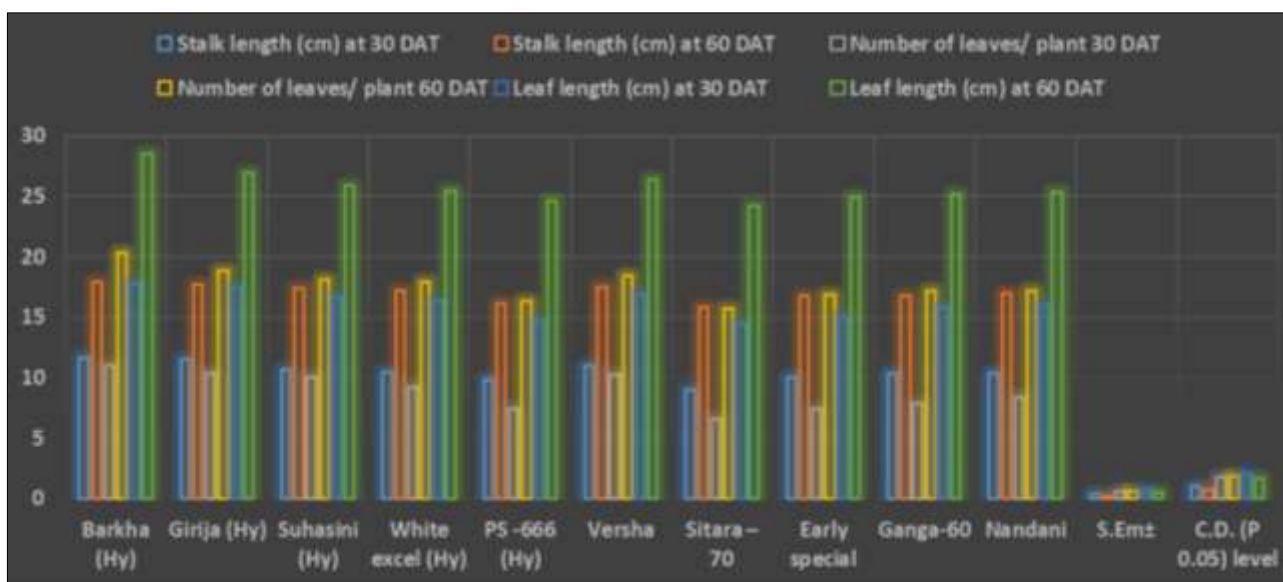


Fig 1: Evaluation of different hybrids of cauliflowers for growth parameters

This is might be due to the superior genetic constituent of variety barkha hybrid and suitability of agro-metrological condition of Malwa Plateau. The close findings of this research are observed by Singh *et al.* (2011)^[13], Singh *et al.* (2013a)^[11], Singh *et al.* (2013b)^[12], Santhosha *et al.* (2014)^[7], Kumar

et al. (2017)^[5], Sharma *et al.* (2017)^[9] and Sharma *et al.* (2018)^[10].

Yield parameters

Table 4: Response of hybrids/ varieties on fresh weight of plant (kg) of cauliflower at harvesting

Treatments	Fresh weight of plant (kg)	Curd maturity duration (days)	Curd length (cm)	Curd width (cm)	Marketable curd yield plot ⁻¹ (kg)	Marketable curd yield hectare ⁻¹ (q)
Barkha (Hy)	1.62	19.8	13.13	15.60	13.542	167.11
Girija (Hy)	1.58	18.9	12.97	14.27	12.083	154.25
Suhasini (Hy)	1.45	18.1	12.27	12.40	11.292	139.34
White excel (Hy)	1.38	17.5	12.13	12.20	10.833	133.69
PS -666 (Hy)	1.13	13.5	11.07	9.67	7.542	93.07
Versha	1.49	16.7	12.67	13.17	12.500	149.11
Sitara - 70	1.03	12.2	9.13	9.53	6.458	79.70
Early special	1.18	14.6	11.13	9.87	7.875	97.18
Ganga-60	1.20	15.2	11.53	11.40	8.917	110.03
Nandani	1.34	15.9	11.73	11.60	9.458	116.72
S.Em±	0.03	0.63	0.50	0.57	0.81	10.01
C.D. (P 0.05) level	0.09	1.87	1.48	1.69	2.41	29.74

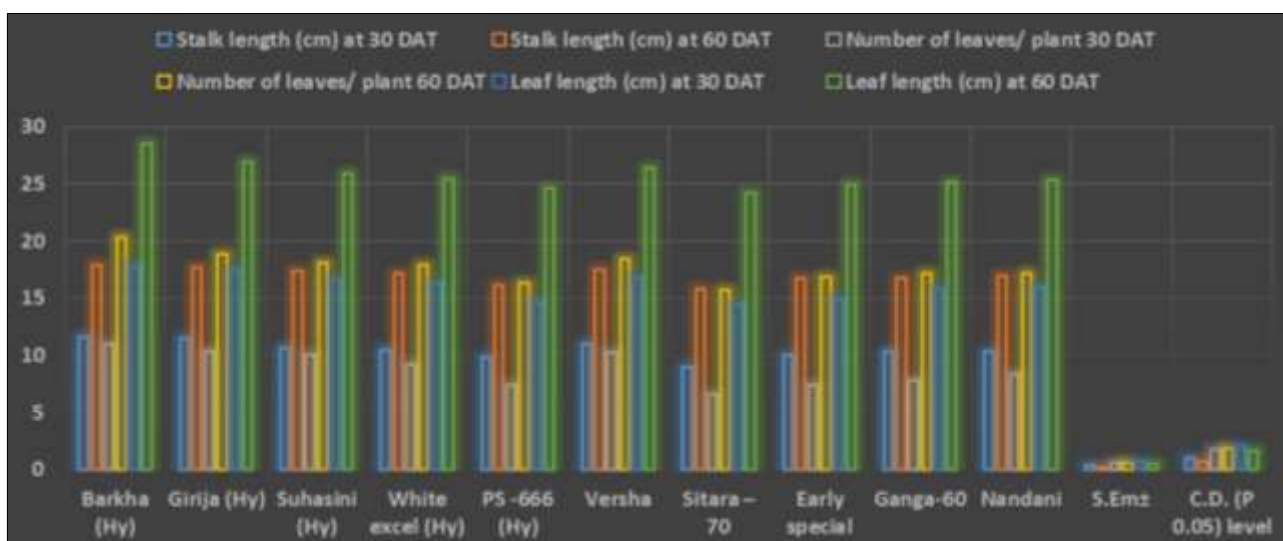


Fig 2: Response of hybrids/ varieties on fresh weight of plant (kg) of cauliflower at harvesting

During the evaluation of yield and yield parameters of cauliflowers the Hybrid Barkha was found significantly superior in all yield and yield parameters. The highest fresh weight of plant (1.62 kg), Curd maturity duration (days (19.8), Curd length (13.13 cm), Curd width (15.60 cm), Marketable curd yield plot⁻¹ (13.542 kg) and Marketable curd yield hectare⁻¹ (167.11 q/ha) were recorded in hybrid barkha while the minimum yield and yield parameters were recorded in, Sitara – 70 variety. The variation for performance of different hybrid and varieties under Malwa palteu of Madhya Pradesh might be due to favorable climatic condition. These findings are in agreement with the findings of Sharma *et al.* (2006)^[8], Kodithuwakku and Kirthisinghe (2009)^[4], Singh *et al.* (2011)^[13], Singh *et al.* (2013a)^[11], Elavarasan *et al.* (2013)^[1], Elavarasan *et al.* (2014)^[2], Santhosha *et al.* (2014)^[7], Manaware *et al.* (2017)^[6], Kumar *et al.* (2017)^[5] and Sharma *et al.* (2018)^[10].

Conclusion

On the basis of current experiment, it is concluded that the cauliflower hybrid Barkha and variety Versha responded well in terms of growth and yield parameter. The genotypes showing greater yield potential with other desirable growth parameters may recommended for farmers.

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