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Evaluation of cauliflower hybrid for growth, yield and quality parameters under the Vindhyan plateau of Madhya Pradesh

Neha Dohre, Sushmita Uikey, RK Dhakad, Dr. SA Ali, RK Jaiswal and Deepesh Kumar Ahirwar

Abstract
The present experiment was laid out at Horticulture Research Farm, Department of Horticulture, R. A. K. College of Agriculture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Sehore, during 2017-2018. The experiment was laid out in Randomized Completely Block Design (RCBD) with three replications and ten treatments viz., Barkha (Hy), Girija (Hy), Suhasini (Hy), White excel (Hy), PS -666 (Hy), Versha, Sitara – 70, Early special, Ganga-60 and Nandani. The evaluation of growth parameters like stalk length, number of leaves plant-1 and leaf length were evaluated and The maximum number of leaves per plant (14.47), Leaf length (26.30 cm), Stalk length (14.67 cm) and Fresh weight of plant (1.62 kg) were find out in hybrid Barkha followed by Girija, variety Versha, Hy Suhasini and Hy White excel. In relation to yield parameters, Significantly the maximum average curd weight (0.542 kg), Total curd yield plot^{-1} (15.498 kg), Total curd yield hectare^{-1} (191.25q/ha) and harvest index (33.43) were observed in Hybrid Barkha followed by hybrid Girija (0.500 kg) and variety Versha (0.483 kg).
During the evaluation of quality parameters. The Hybrid Barkha was observed highest TSS (7.55^{0}Brix) and self-life (8.17 days) followed by other treatments. Economically the hybrid Berkha also found superior.

Keywords: Barkha hybrid, number of leaves, TSS, self life, yield

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) [17].
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) [4].
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.
A lot of cauliflower hybrids/varieties are being grown by the farmer's, but best performing hybrids/varieties of cauliflower having desirable quantitative and qualitative characters such as adoptability to adverse environments and resistance to biotic and a biotic stresses 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 also screen out to which hybrid/variety

well adopted and produced maximum yield to another variety under Vindhyan plateau.

Material 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 27.05^0 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% salt 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

Result

In this experiment the growth, yield and quality parameters were evaluated and it is discussed as per following data.

Growth parameters

These growth parameters is illustrated in table: 2 and fig 2. The growth parameters like number of leaves per plant, Leaf length and Stalk length were evaluated during the experiment and the growth parameters were recorded at 45 day after transplanting. The maximum number of leaves per plant (14.47), Leaf length (26.30 cm), Stalk length (14.67 cm) and Fresh weight of plant (1.62 kg) were find out in hybrid Barkha followed by Girija, variety Versha, Hy Suhasini and Hy White excel. Whereas, Sitara – 70 was noted minimum in all growth parameters. The variation for growth parameters were also observed by Singh *et al.* (2011) [16], Singh *et al.* (2013a) [14], Singh *et al.* (2013b) [15], Santhosha *et al.* (2014) [11].

Table 2: Response of hybrids/ varieties on growth parameters of cauliflower

Treatments	Number of leaves plant^{-1} at 45 DAT	Leaf length (cm) at 45 DAT	Stalk length (cm) at 45 DAT	Fresh weight of plant (kg)
Barkha (Hy)	14.47	26.30	14.67	1.62
Girija (Hy)	14.07	25.85	14.40	1.58
Suhasini (Hy)	13.80	25.12	13.80	1.45
White excel (Hy)	13.33	24.88	13.73	1.38
PS -666 (Hy)	11.33	23.23	12.93	1.13
Versha	13.87	25.45	14.00	1.49
Sitara – 70	10.60	22.68	12.80	1.03
Early special	11.75	23. 82	13.33	1.18
Ganga-60	11.93	24.05	13.40	1.20
Nandani	12.60	24.60	13.47	1.34
S.Em±	0.56	0.55	0.26	0.03
C.D. (P 0.05) level	1.65	1.63	0.77	0.09

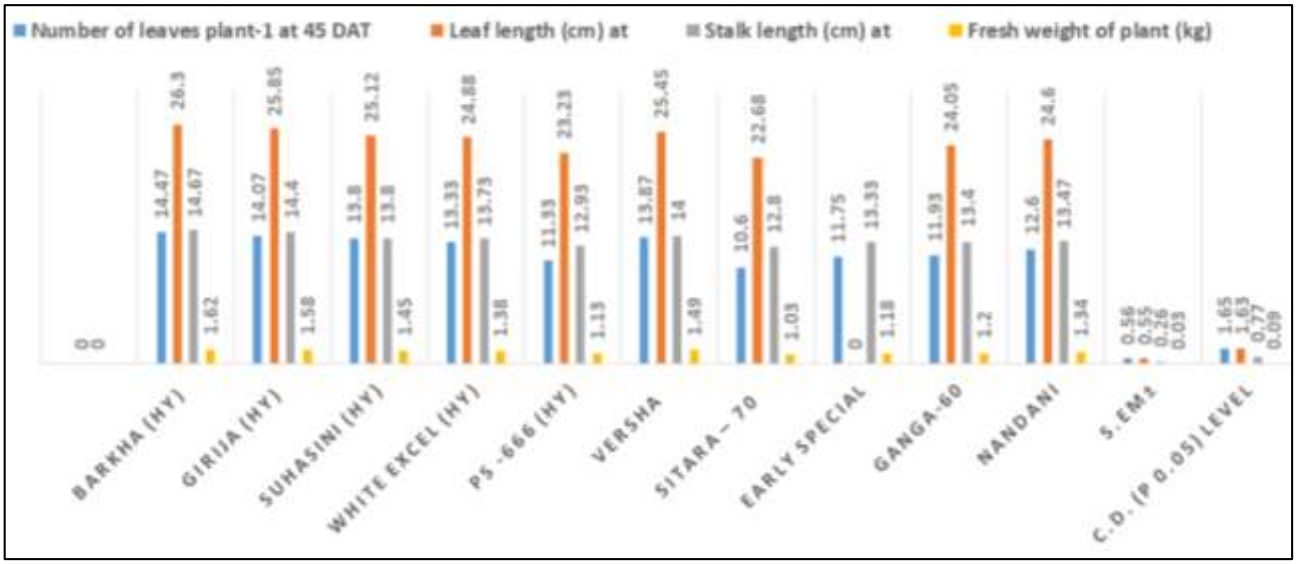

Fig 2: Response of hybrids and varieties on growth parameters of cauliflower

Yield parameters

During the experiment, the yield parameters were evaluated based following yield and yield parameters viz., average weight of curd, total curd yield per plot, total curd yield per hectare and harvest index. Significantly the maximum average curd weight (0.542 kg), Total curd yield plot^{-1} (15.498 kg), Total curd yield hectare^{-1} (191.25 q/ha) and harvest index (33.43) were observed in Hybrid Barkha followed by hybrid Girija (0.500 kg) and variety Versha (0.483 kg). While, the minimum yield parameters were observed in in Sitara-70. These findings are in agreement with the findings of Kodithuwakku and Kirthisinghe (2009) [6], Kumar *et al.* (2010) [7], Elavarasan *et al.* (2013) [3], Nimkar and Korla (2014) [9]. This is indicated in table: 3 and fig: 3.

Table 3: Response of hybrids/ varieties on yield parameters parameters of cauliflower

Treatments	Average curd weight (kg)	Total curd yield plot^{-1} (kg)	Total curd yield hectare^{-1} (q)	Harvest index (%)
Barkha (Hy)	0.542	15.498	191.25	33.43
Girija (Hy)	0.500	14.413	177.86	31.65
Suhasini (Hy)	0.452	12.982	160.19	31.27
White excel (Hy)	0.433	12.417	153.22	31.41
PS -666 (Hy)	0.302	8.793	108.51	27.04
Versha	0.483	13.833	170.71	32.44
Sitara – 70	0.258	7.602	93.80	25.10
Early special	0.315	9.175	113.22	26.70
Ganga-60	0.357	10.377	128.05	29.91
Nandani	0.378	11.065	136.54	28.15
S.Em±	.03	0.85	10.47	1.06
C.D. (P 0.05) level	0.08	2.52	31.09	3.15

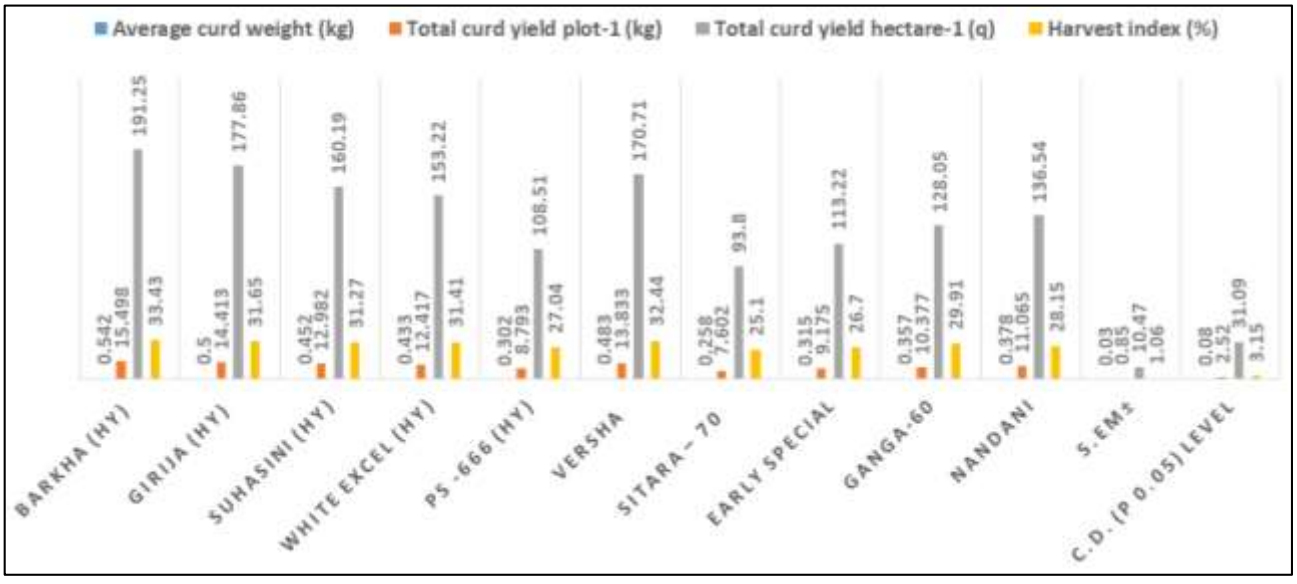

Fig 3: Response of hybrids/ varieties on yield parameters parameters of cauliflower

Quality parameters and benefit cost ratio

The quality parameters is indicated in table: 4 and figure: 4, the TSS and self-life of curd were significantly influenced by the different treatments. The Hybrid Barkha was observed highest TSS (7.55^{0}Brix) and self-life (8.17 days) followed by hybrid Girija (7.36^{0}Brix), variety Versha (7.21^{0}Brix), Hy Suhasini (7.09^{0}Brix) and Hy White excel (6.85^{0}Brix). Whereas, the lowest TSS (5.54^{0}Brix) and self-life of curd were was found in Sitara – 70.

In relation to evaluation of economics of different hybrid or verities

It is revealed form the date obtained that a significantly maximum curd yield (191.25 q/ha) was obtained in cauliflower Hybrid Barkha and the highest benift cost ratio was also found in hybrid barkha fillowed by other treatments. Similar results have been reported by Chaurasia *et al*. (2009) [2].

Table 4: Response of hybrids/ varieties on TSS (^{0}Brix) and shelf life of cauliflower

Treatments	TSS (^{0}Brix)	shelf life (days)	B : C ratio
Barkha (Hy)	7.55	8.17	5.24
Girija (Hy)	7.36	7.53	4.84
Suhasini (Hy)	7.09	6.10	4.37
White excel (Hy)	6.85	5.80	4.19
PS -666 (Hy)	5.83	5.30	2.92
Versha	7.21	6.53	4.68
Sitara – 70	5.54	5.00	2.50
Early special	5.95	5.50	3.05
Ganga-60	6.01	5.67	3.45
Nandani	6.25	5.70	3.66
S.Em±	0.42	0.35	
C.D. (P 0.05) level	1.25	1.05	

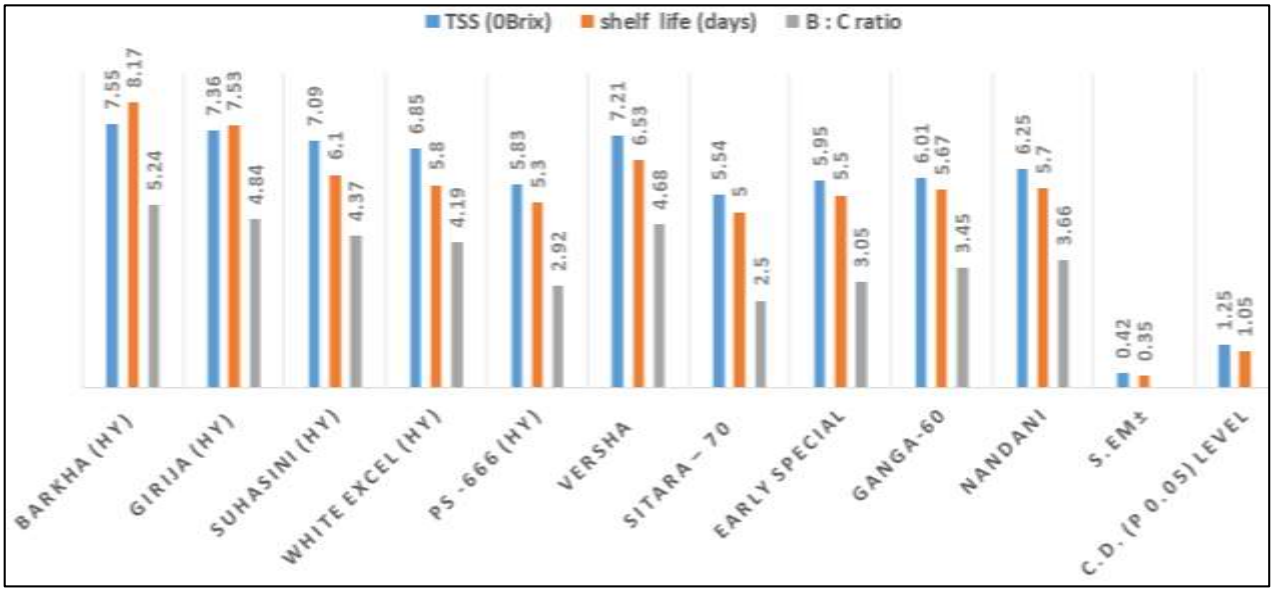

Fig 4: Response of hybrids/ varieties on TSS (^{0}Brix) and shelf life of cauliflower

Conclusion

It is concluded that the highest total curd yield and benefit cost ratio were reported in hybrid Bharkha therefore it is recommended for cultivation in MP. These were identified as best hybrid or variety for cultivation in Vindhyan Plateau agro-climatic region of M.P.

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