

ADAPTABILITY OF CAULIFLOWER GENOTYPES IN THE HIGH RANGES OF KERALA

Cole crops in general and cauliflower in particular are highly sensitive to the weather conditions. Indian cauliflower has undergone fast diversification within a short period of two centuries of its introduction (Seshadri and Chatterjee, 1996). With the development of tropical cauliflower varieties at IARI, New Delhi, the cultivation has spread to the non-traditional areas in South India including Karnataka and Tamil Nadu. The high range regions of Kerala offers ample scope for the cultivation of cole crops, which in turn would reduce the consumer dependence on supply from neighbouring states. Though cv. Pusa Early Synthetic, which curds at 22-27°C is recommended for cultivation in Kerala (Singh *et al.*, 1994) its adaptability has not been tested so far. As there exist early, mid and late cultivars in cauliflower, it warrants a thorough evaluation for its suitability in the intensive cropping pattern prevalent in Kerala. Earlier studies in cauliflower at the RARS, Ambalavayal showed normal formation of curds in cauliflower when planted during the month of October (KAU, 1999). A study was conducted in this background at the RARS, Ambalavayal, Wayanad, located at an altitude of 974 m above msl, to investigate the performance of different cauliflower cultivars through sequential planting starting from October.

Six cultivars of cauliflower viz. PES-1, F1-598, PES-3, Pusa Early Synthetic (all early types), Pusa Sharad (mid) and Super Snowball (late) were planted for three consecutive seasons at 20 days interval starting from 5.10.2000 at the RARS, Ambalavayal. The area experiences a mild sub-tropical climate during October to February. The temperature experienced during the above period is given on weekly basis in Table 1. The field experiment was laid out in split-plot design with dates of planting as main plot and varieties as sub-plot treatments. The seedlings were transplanted at a spacing of 60 x 45 cm. The data on days to maturity, stalk length, leaf number, gross curd weight, net curd weight and per hectare yield were subjected to statistical analysis (Panse and Sukhatme, 1984).

The analysis of variance revealed, significant difference between the varieties as well as for dates of planting, for days to maturity, gross

curd weight, net curd weight and per hectare yield (Table 2 & 3). The interaction between varieties and dates of planting were significant for days to maturity, stalk length, leaf number, gross/net curd weight and yield.

The late planting of cauliflower (16 Nov 2000) significantly lowered the time taken for curding (68.9 days) without affecting the curd size. Among the varieties PES-1 and F1-598 produced curds earlier and were statistically on par. The highly significant interaction between varieties and dates of planting indicates the critical influence of environment on genotypes in inducing the earliness in cauliflower. PES-1 and F1-598 took only 66 days to form curds when planted on 5 Oct 2000.

The vegetative characters such as stalk length and leaf number significantly differed for various dates of planting. Though, the interactions between varieties and dates of planting were significant for stalk length and leaf number, genotypes do not exhibit significant difference individually for these characters. Early planting induced production of more number of leaves and short stalks. Super Snowball produced more number of leaves with early planting (37.5) while it was minimum (5) when the same variety was planted late. Super Snowball, being a late type, performed better under cooler climates, coinciding with the first date of planting in the present study. This is in conformity with the earlier findings of Choudhary and Ramphal (1961).

The early planting produced the largest net and gross curd weight and total yield. The cultivar PES-1, F1-598, PES-3 and Pusa Sharad produced the largest curds (both net and gross) and was statistically on par. The highly significant interaction between varieties and dates of planting signifies the need for selecting suitable genotypes and season of cultivation for realizing potential yields. F1-598 produced the largest curd in the first date of planting. Performance of PES-1, PES-3, Pusa Early Synthetic and Pusa Sharad were statistically on par for first date of planting. There was a drastic reduction in curd weight during second and third dates of planting for all the cultivars, which reveals that even a 20 days interval in planting is

Table 1. Maximum and minimum temperature during different dates of planting

Weeks	From 5 Oct 2000		From 25 Oct 2000		From 16 Nov 2000	
	Maximum temperature °C	Minimum temperature °C	Maximum temperature °C	Minimum temperature °C	Maximum temperature °C	Minimum temperature °C
I	25.6	18.0	27.4	17.0	26.8	17.5
II	27.5	18.3	27.7	17.6	27.1	16.4
III	26.5	18.0	27.6	17.2	25.3	17.0
IV	27.4	17.1	26.6	17.3	25.5	13.2
V	27.9	17.7	27.4	17.0	25.8	14.0
VI	27.3	17.0	25.2	16.6	26.6	15.2
VII	26.8	17.5	25.8	13.9	25.8	17.4
VIII	27.1	16.4	26.0	13.3	26.5	15.3
IX	25.3	17.0	26.4	15.5	27.7	16.3
X	25.5	13.2	25.7	17.1	27.5	15.5
XI	25.8	14.0	26.8	15.7	28.5	18.8
XII	26.6	15.2	27.5	16.0	29.8	18.4
XIII	25.8	17.4	27.4	15.5	29.3	15.9
XIV	26.5	15.3	28.5	16.4	30.1	18.8
XV	27.7	16.3	28.6	18.1	30.1	19.8
Mean	24.76	16.56	26.97	16.28	27.49	16.63

Table 2. Mean and interaction effects on days to maturity, stalk length and leaf number in cauliflower as influenced by date of planting

Variety	Days to maturity				Stalk length (cm)				Leaf number			
	5 Oct	25 Oct	16 Nov	Mean (2)	5 Oct	25 Oct	16 Nov	Mean (2)	5 Oct	25 Oct	16 Nov	Mean (2)
PES-1	66.0	68.0	77.5	70.5	3.00	4.50	4.00	3.83	17.00	12.50	16.00	15.17
F1-598	66.0	68.5	76.5	70.3	3.25	7.50	7.00	5.92	15.50	15.00	14.50	15.00
PES-3	74.0	69.0	80.5	74.5	3.50	5.50	7.50	5.50	19.00	16.50	17.00	17.50
Pusa Early Synthetic	85.5	84.5	85.5	85.2	5.50	4.00	8.00	5.83	19.50	13.00	15.00	15.83
Pusa Sharad	88.0	83.5	93.5	88.3	6.00	5.00	7.00	6.00	22.00	16.50	15.50	18.00
Super Snowball	92.0	90.0	0	60.7	6.50	3.00	2.00	3.83	37.50	12.00	5.00	18.17
Mean (1)	78.6	77.3	68.9		4.63	4.92	5.92		21.75	14.25	13.83	
CD (1)	4.862**				0.527*				6.442**			
(2)	2.279**				-				-			
(1x2)	3.947**				3.321*				8.023**			

*Significant at 5% level; **Significant at 1% level

critical for this temperature sensitive crop. The highest yield was obtained with the early planting (7.512 t ha^{-1}) and among the varieties, PES-1 was superior in all the planting dates (5.801 t ha^{-1}). Significant interaction was observed between varieties and planting time

with respect to the yield. The highest yield was obtained with PES-1 (11.293 t ha^{-1}), while super Snowball did not produce any curds in late planting. Late planting resulted in low yield, which may be due to the unfavourable temperature conditions as reported by the earlier

Table 3. Mean and interaction effects on yield components in cauliflower as influenced by date of planting

Variety	Gross curd weight (g)				Net curd weight (g)				Yield (t ha ⁻¹)			
	5 Oct	25 Oct	16 Nov	Mean (2)	5 Oct	25 Oct	16 Nov	Mean (2)	5 Oct	25 Oct	16 Nov	Mean (2)
PES-1	332.5	117.5	140.0	196.7	310.0	102.5	130.0	180.8	11.293	2.569	3.542	5.801
F1-598	455.0	127.5	100.0	227.5	407.5	12.5	90.0	203.3	9.903	2.513	1.139	4.518
PES-3	350.0	140.0	150.0	213.3	322.5	130.0	135.0	195.8	7.653	2.639	3.084	4.459
Pusa Early Synthetic	320.0	75.0	110.0	168.3	286.0	67.5	100.0	151.2	6.583	0.417	2.056	3.018
Pusa Sharad	335.0	132.5	230.0	232.5	295.0	122.5	195.0	204.2	5.611	1.375	3.028	3.338
Super Snowball	220.0	95.0	0	105.0	195.0	90.0	0	95.0	4.028	0.514	0	1.514
Mean (1)	335.4	114.6	121.7		302.7	104.2	108.3		7.512	1.671	2.141	
CD (1)	46.90**				50.19**				9.78**			
(2)	50.11**				48.57**				1.84**			
(1x2)	86.79**				84.13**				3.18*			

*Significant at 5% level; **Significant at 1% level

workers (Sharma and Choudhary, 1996). The present investigation revealed that synthetic cultivars belonging to the early maturing type of tropical cauliflower performs better under high range conditions of Kerala. Presumably, the performance of mid season (Pusa Sharad) and late types (Super Snowball) was poor in all the

planting dates. Even for the tropical cauliflower types, a difference of 20 days in planting resulted in drastic reduction in production of curds and its size. Early planting (first week of October) is ideal for realizing potential yields in cauliflower under high range situations of Kerala.

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