J. Sci. technol. (Dinajpur) Vol. 5: 67-73 (2007)
ISSN 1994-0386

EFFECT OF PLANTING TIME AND CURD SCOOPING ON SEED PRODUCTION OF CAULIFLOWER VAR. 'BARI FUL KAPI-1'

M. Moniruzzaman[1], Z. A. Firoz [2], A. S. M. H. Rashid[1] and G. M. A. Halim[3]

ABSTRACT

The experiment was conducted at the Agricultural Research Station, Raikhali, Rangamati Hill District during the Rabi seasons of 2004-05 and 2005-06 to study the effect of planting time and curd scooping on the seed production of cauliflower var. BARI Fulkapi-1. Four planting dates at fortnight interval (15 October, 1 November, 15 November and 1 December) and curd scooping at edible maturity stage and a control (no curd scooping) were used. The experiment was laid out in the randomized complete-block design with four replications. Yield, yield attributes and other characteristics were significantly influenced by both the factors studied. The floral initiation (134-126 days) as well as the siliqua maturity (186-175 days) arrived earlier as the planting got delayed starting from 15 October to 1 December. The early (15 October) planting gave significantly maximum plant height, pods plant^{-1}, 1000-seed weight and seed yield plant^{-1}, which were statistically identical with the 1 November planting. The highest seed yield (321.17 kg ha^{-1}) was obtained from 15 October planting closely followed by 1 November planting (319.08 kg ha^{-1}). Curd scooping significantly influenced early flowering and siliqua maturity than that of no scooping. Curd scooping also significantly outyielded no curd scooping for seed yield and other attributes viz pods plant^{-1}, length of pod, seeds pod^{-1}, 1000-seed and seed germination. 15 October planting coupled with curd scooping gave the highest seed yield (22.36 g plant^{-1} and 596.46 kg ha^{-1}) which was at par with 1 November planting with curd scooping.

Key words: *Cauliflower, Planting time, Curd scooping, Seed production, Rangamati*

INTRODUCTION

Cauliflower (*Brassica oleracia var botrytis* L.) is one of the most important winter vegetables in Bangladesh (Rashid, 1999). BARI fulkapi-1, being an open pollinated (OP) variety (Islam *et al*., 2004), is most popular among the growers, since it fetches a good premium both as a curd as well as a seed crop. The varieties of any crop can express their potentiality only when grown under optimum conditions with the special emphasis to date of planting. Generally the time of planting depends on the climate of a region and the variety to be grown (Firoz *et al*., 2000) and the purposes of growing crops. Seed production of cauliflower is greatly influenced by the prevailing temperature, especially at flowering and seed setting periods (Mohanty and Srivastova, 2002). Padda and Singh (1981) opined that the climatic requirements for seed stalk development in various cultivars of cauliflower are very precise. Seed production of this crop is well in areas where the temperatures during the flowering and the seed setting stages of the plants remain within the range of 15.5 to 26.6 °C (Rahman *et al.*, 1996). So, planting time is crucial for the yield and quality of cauliflower seed.

Head rottening, irregular and delayed flower stalk emergence and empty siliqua production are some of the common problems found to be associated with cauliflower seed production

[1]Agricultural Research Station, Raikhali, Chandraghona, Rangamati,[2]Regional Agricultural Research, Station, Hathazari, Chittagong,[3]Vegetable Division, HRC, BARI, Jodebpur,Gazipur

(Rahman *et al*., 1988). Farmers, therefore, need its improved seed production technology package for the same. Again curd scooping is one of the most important technologies employed for quality seed production of cauliflower (Choudhury, 1979; Sinohara, 1984). In the absence of the technical know how about the seed production technology, the production of quality seed in cauliflower is not up to the mark in Bangladesh. Therefore, the present investigations were initiated to study the effect of planting time and curd scooping on the seed production of cauliflower var. BARI Fulkapi-1.

MATERIALS AND METHODS

The experiment was carried out in the acidic soil at Agricultural Research Station, Raikhali, Rangamati Hill District during the Rabi seasons of 2004-05 and 2005-06 on a well drained soil under irrigated conditions. The experimental field was sandy clay loam with pH 5.7 and organic matter 0.58%, total available N 0.076%, available K 0.19 meq/100 g soil, available P 17 µg/g, available S 12µg/g and available B 0.2 µg/g. The treatments were four planting times viz., 15 October, 1 November, 15 November and 1 December and two curd scoopings: one at the edible maturity stage and one control (no curd scooping). The trial was laid out in the randomized complete block design having four replications. Thirty days old seedlings of the cauliflower cv. BARI Fulkapi-1 were transplanted in each experimental plot (3.0 x 2.4 m) as per schedule with a spacing of 60 x 50 cm. Manures and fertilizers were applied @ compost 10 t ha^{-1} of, N, P_2O_5, K_2O, S and B @ 150, 80, 70, 40 and 2 kg ha^{-1} respectively. N, P_2O_5, K_2O, S and B were applied in the form of urea, TSP, MP, gypsum and boric acid, respectively. Full amount of compost, TSP and boric acid, one-third urea and MP were applied during transplanting and the remaining urea and MP were applied in two equal splits at the curd initiation and the bolting stage. Irrigation and weeding were done as and when needed. In case of scooping treatment curds were centrally scooped at 5 cm radius with a sharp knife. After scooping, Dithane M-45 @ 2 g L^{-1} H_20 was sprayed thrice at an interval of seven days as a preventive measure against fungal infection. During the flowering and the seed formation stages, optimal soil moisture contents were maintained through irrigation and bamboo stick supports were given to prevent lodging. Mature pods (siliquas) were harvested periodically and threshed after proper drying. Observations were recorded on days to 25% flowering from seedling transplanting, days to 50% siliqua maturity from seedling transplanting, plant height, number of branches $plant^{-1}$, length of pod, number of seeds pod^{-1}, 1000-seed weight and seed yield $plant^{-1}$ from 10 randomly selected plants from each plot. The recorded seed yield $plot^{-1}$ was converted to per hectare yield. Collected data were subjected to statistical analyses and means were compared using the LSD test at 5% level of probability. The mean temperatures prevailed in October, November, March, April and May of the experimentation period are also noted for interpretation of the results (Figure 1).

RESULTS AND DISCUSSION

Effects of planting time

All the parameters studied including seed yield were found to be influenced significantly due to different planting dates and curd scooping (Tables 1 and 2). Plant height was maximum (94.83 cm) when planted on 1 November closely followed by 15 October planting (94.54 cm); while 1 December planting produced the plants with 83.28 cm height which was significantly lower. The plants planted on 1 December took the lowest days (96 days) to reach 25% flowering stage whereas it was highest for 15 October planting (104 days) closely followed by 1 November planting (103 days). The lowest number of days were required to reach 50 siliqua maturity stage (145 days) for 1 December planting and the highest days for 15 October planting (156

days) closely followed by 1 November planting (155 days). Number of flower stalks per plant was highest in 1 November planting (9.72), which was statistically at par with 15 October planting (9.55) and the lowest from 1 December planting (4.25). The highest number of pods were produced from the plants planted on 15 October (711.44), which was statistically similar with that of 1 November planting (706.71) and the lowest number of pods were recorded from 1 December planting (294.74). The highest length of pods was recorded from 1 November planting (3.50 cm) closely followed by 15 October and 15 November planting and the lowest length from 1 December planting. Significantly the highest number of seeds (7.98pod^{-1}), 1000-seed weight (1.75 g) and seed yield plant^{-1} (12.04 g) were obtained from 15 October planting and their lowest values recorded from 1 December planting. There were no significant differences between 15 October and 1 November planting in respect of 1000-seed weight as well as seed yield plant^{-1}. The highest seed yield was recorded from 15 October planting (321.17 kg/ha) closely followed by 1 November planting (319.08 g/ha). The lowest yield of seed was noticed when plants were planted on 16 December (58.71 kg/ha). It might be due to high temperature during seed formation in the early March (Figure 1). Odland (1950) also reported that poor seed formation took place at a temperature above 23°C in cole crops. The germination percentages of seeds obtained from different plantings were not significant. The plants of 15 November and 1 December planting had the shortest vegetative phase and flowered earlier at a comparatively higher temperature than the other plantings. As cool climate is essential for flowering and pod setting in cauliflower, plants planted on 15 December produced minimum number of flower stalks, number of pods plant^{-1}, length of pod, seeds pod^{-1}, and 1000-seed weight. All these reasons might be the causes for the lowest seed yield in 16 December planting. These results were in perfect agreement with those of Rahman *et al*. (1996), Firoz *et al*. (2000) and Mohanty and Srivastava, (2002).

Error! Not a valid link.

Figure 1. Monthly mean temperature from October to May (average of 2004-05 and 2005-06

Ta

cauliflower var. BARI Ilikapi 1 (pooled analyses of the years 2004-05 and 2005-06)

Treatment	Plant height (cm)	Flower stalks plant^{-1} (no.)	Pods plant^{-1} (no.)	Length of pod (cm)	Days to 25% flowering *	Days to siliqua maturity *
Planting time						
15 October	94.54	9.55	711.44	3.49	104	156
1 November	94.83	9.72	706.71	3.50	103	155
15 November	91.26	9.30	621.54	3.49	101	153
1 December	83.28	4.25	294.74	2.57	96	145
LSD (0.05)	1.06	0.19	7.67	0.14	1.13	1.18
Curd scooping						
No Curd scooping	91.22	9.47	350.44	2.45	106	161
Curd scooping	90.73	6.94	991.99a	4.09	95	144
LSD (0.05)	NS	1.59	11.01	0.57	5.59	2.67
CV (%)	5.12	4.21	4.26	4.08	5.75	3.85

* From seedling (30 days old) transplanting

LSD values were given only for significant parameters. NS = Not significant

Effects of curd scooping

Effect of curd scooping on the yield and yield attributes as well as quality of cauliflower seeds are presented in the tables 1 and 2. All the parameters presented differed significantly except the plant height. Days to 25% flowering and days to 50% siliqua maturity were the highest from the no curd scooping treatment. Though significantly the highest number of flower stalks plant^{-1} was obtained from no scooping, number of pods plant^{-1} (991.99), length of pod (4.09 cm), seeds pod^{-1} (8.29), 1000-seed weight (1.96 g), seed yield (16.89 g plant^{-1}, 444.46 kg ha^{-1}) and seed germination were found highest when the curds were subjected to curd scooping. These results are in perfect agreement with Rahman *et al.* (1988) who got higher values for the above parameters in the curd cutting treatment. The results also clearly revealed that curd scooping had positive effects on the yield and the quality of cauliflower seeds. This might be due to the fact that flower stalks produced from the scooped curd were not as compact as the no scooping and also got more space which decreased competition among the flower stalks resulting more seed yield. In case of the control plants (without curd scooping), the flower stalks produced were more compact, which may lead to competition among the flower stalks for space, nutrients etc, the normal growth and development of seeds was hampered.

Table 2. Effect of time of planting and curd scooping on seed yield and yield parameters of cauliflower var. BARI ful kapi 1 (pooled analyses of the years 2004-05 and 2005-06)

Treatment	Seedspod^{-1} (no.)	1000-seed weight (g)	Seed yield Plant^{-1} (g)	Seed yield (kgha^{-1})	Seed germination (%)
Planting time					
15 October	7.98	1.75	12.04	321.17	81.83
1 November	7.61	1.73	11.95	319.08	81.38
15 November	7.57	1.68	10.31	262.66	81.93
01 December	4.00	1.35	2.12	58.71	81.78
LSD (0.05)	0.10	0.046	0.35	13.96	NS
Curd scooping					
No Curd scooping	5.20	1.29	7.92	218.04	70.00
Curd scooping	8.29	1.96	16.89	444.46	93.46
LSD (0.05)	1.08	0.31	3.04	48.32	15.01
CV (%)	3.55	3.64	3.75	5.59	3.85

LSD values were given only for significant parameters. NS = Not significant

Combined effect of planting time and curd scooping

The combined effect of planting time and curd scooping was presented in the table 3. Significantly highest plant height was recorded from 1 November planting with no curd

scooping (95.09 cm), which was statistically similar to 15 October planting with both no curd scooping and curd scooping, and 1 November planting with curd scooping.

Days to 25% flowering and 50% siliqua maturity decreased with the advancement of transplanting time commencing from 15 October to 1 November irrespective of curd spooking and no spooking. The highest number of days was required to reach 25% flowering and 50% siliqua maturity stages during 15 October planting with no curd scooping whereas it was lowest in case of 1 December planting with curd scooping. Significantly the highest number of primary flower stalks per plant was obtained from 1 November planting with no curd scooping (11.12) closely followed by 15 October planting with no curd scooping. Number of pods (1212.43 plant^{-1}), seeds pod^{-1} (9.58), seed yield (22.36 g/plant) and 596.46 kg/plant) were found maximum from 15 October planting with curd scooping and their lowest values from 1 December with no curd scooping. But the highest length of pod and the 1000-seed weight (2.11 g) were recorded in 15 November planting with curd scooping. There were not significant differences between 15 October and 1 November transplanting with curd scooping in respect of length of pod, seeds pod^{-1}, 1000-seed weight and seed yield. As the pods per plant, seeds per pod and seed yield per plant were higher in the plants of 15 October planting with curd scooping, those combinedly results higher seed yield in the same treatment combination

Table 3. Combined effect of planting time and curd scooping on growth, yield and yield attributes of the cauliflower var. BARI ful kapi 1(pooled analyses of the two year results)

Treatment combination	Plant height (cm)	Branches plant^{-1} (no.)	Pods plant^{-1} (no.)	Length of pod (cm)	Seeds pod^{-1} (no.)	1000-seed weight (g)	Seed yield Plant^{-1} (g)	Seed yield (kg ha^{-1})	Days to 25% flowering*	Days to 50% Siliqua maturity*	Seed germination (%)
No curd scooping											
15 October	94.60	11.09	210.45	2.62	6.01	1.40	10.32	273.42	109.30	165.21	70.03
01 November	95.09	11.12	213.17	2.61	5.77	1.34	10.26	275.10	108.80	163.18	69.98
15 November	92.36	10.71	187.41	2.52	5.83	1.30	9.06	241.08	106.00	162.77	70.37
01 December	82.84	4.98	89.85	2.02	3.20	1.11	1.98	80.76	101.22	152.75	69.97
Curd scooping											
15 October	94.47	8.02	1212.43	4.36	9.58	2.10	22.36	596.46	97.66	147.53	93.63
01 November	94.57	8.32	1200.25	4.40	9.46	2.11	22.20	592.31	96.89	146.75	93.45
15 November	90.15	7.90	1055.67	4.46	9.32	2.05	19.13	485.14	95.90	143.00	93.48
01 December	83.72	3.53	499.63	3.13	4.80	1.60	3.90	103.95	90.70	138.00	93.58
LSD (0.05)	1.50	0.27	10.85	0.19	0.15	0.065	0.58	19.74	1.59	1.67	NS
CV (%)	5.12	4.21	4.26	4.08	3.55	3.64	3.75	5.59	4.08	5.75	3.85

* From seedling (30 days) transplanting
LSD values were given only for significant parameters. NS = Not significant

Thus the findings of the present study led to the suggestion that transplantation could be done from 15 October to 1 November for higher cauliflower seed yield and curd scooping is better for seed production of the cauliflower var. BARI Ful Kapi-1. However, further study is needed to standardize the nature of scooping.

REFERENCES

Chowdhury B. 1979. Vegetables. National Book Trust, New Delhi, India, pp. 64-72.

Firoz ZA, Choudhury MMU, Choudhury AK and. Hoque AFME. 2000. Effect of planting time and main curd removal on the seed production of broccoli in the hilly region. Bangladesh J. Agril. Res. 25 (3): 499-504.

Islam et al. 2004. Edited. Krishi Prozukti Hatboi (Handbook on Agrotechnology), 2nd edn. Bangladesh Agricultural Research Institute, Gazipur-1701, Bangladesh. p. 353.

Mohanty S and Srivastova BK. 2002. Effect of time of planting and method of crop raising on seed production of 'Pant Shubhra' mid-season cauliflower (*Brassica oleracea* var *botrytis* subvar *cauliflora)*. Indian J. Agril. Sci. 72 (6): 350-352.

Odland ML and Noll CJ. 1950. The utilization of cross compatibility and self incompatibility in the production of F_1 hybrid cabbage, PASH. 55: 391-402.

Padda DS and Sing J. 1981. Seed Production of vegetable Crops, edn. 2, Punjab Agricultural University, Ludhiana. pp. 22-25.

Rahman MAKM, Hossain SMM, Hoque MM and Hoque MM. 1988. Effect of different curd cutting methods on the production of cauliflower seeds. Bangladesh Hort. 16 (1): 50-53.

Rahman MT, Ahmed S, Hossain AE, Saha SR and Sarker AK. 1996. Seed yield of cauliflower as influenced by dates of planting. Bangladesh Hort. 24 (1 & 2); 91-95.

Rashid MM 1999. Sabji Biggayan (In Bengali). Rashid publishing House, 94, Old DOHS, Dhaka-1206. p. 223.

Sinohara S. 1984. Vegetable Seed Production Technology in Japan Elucidated with Respective Variety Development Histone Particular. Shinohara's Authorized Agricultural Consulting Engineer Office, 4-7-7, Nishiooi, Shinagawa-Ku, Tokyo, Japan. Ref. No. 4 (iii), vol. 1.