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Effect of planting time on growth and yield of four promising pointed gourd genotypes

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Abstract

An experiment was conducted at Regional Agricultural Research Station, Ishurdi, Pabna during the growing seasons of 2001-2002 and 2002-2003 to study the effect of planting time on the growth and yield of four promising genotypes of pointed gourd. The experiment involved seven planting time viz. September 1, October 1, November 1, December 1, January 1, February 1 and March 1 and four promising genotypes of pointed gourd viz. PG-001, PG-003, PG-020 and PG-025. Yield contributing characters and yield showed significant positive response to October planting. Among the genotypes, PG025 was found to be the best for yield of fruits followed by PG020. Yield declined gradually for delay in planting after October. The highest yield (35.45 t/ha) was recorded from genotype PG025 planted in October and the lowest yield (9.00 t/ha) was recorded from genotype PG-003 planted in March.

Keywords: Pointed gourd, Planting time, Genotype, Growth and Yield

Introduction

Pointed gourd (*Trichosanthes dioica*) is one of the most popular cucurbitaceous vegetables cultivated in Bangladesh. In Bangladesh, pointed gourd was cultivated in 6,882 ha of land with total production and average yield of 41,000 tons and 5.87 tons/ha, respectively during 2003-2004 (BBS, 2004). During summer and rainy season, the scarcity of vegetables is a serious problem in this country. Being a summer vegetable with long availability from March to October, pointed gourd plays an important role to meet up the demand of vegetables during that lean period of the year. However, there is no recommended variety of this important vegetable in our country. Farmers cultivate the locally available pointed gourd cultivars. An attempt has been made to collect and evaluate the available pointed genotypes of the country (Khan, 2006). Planting time plays an important role in crop production. Optimum planting time depends on genotypes, edaphic and environmental factors of the locality. In our country, pointed gourd is planted during September to March. Rashid (1999) stated that, early planting (October - November) gives early fruiting in March and April. On the other hand, late planting (January - March) gives fruiting in June and July. Year round production of pointed gourd is possible through adjusting planting time. Nath and Subramanyam (1972) reported that pointed gourd can be planted in July – August or September-October to March under Indian conditions. But according to Choudhury (1992) and Velayudhan and Singh (1994) cuttings are prepared in October and are ready for transplantation in the field during February-March. The yield of pointed gourd is very low than expected. Lack of proper varieties and information regarding optimum planting time are considered very important factors for low yield of this important vegetable crop. Information regarding optimum planting time for a particular genotype of pointed gourd will be useful to the farmers for optimum and economic use of their land and resources. However, no systematic research work has been carried on planting time of pointed gourd using different genotypes under Bangladesh conditions. So, the present work was undertaken to find out the optimum planting time for four promising genotypes of pointed gourd under Ishurdi conditions, an important pointed growing area of Bangladesh.

Materials and Methods

The experiment was conducted at the Regional Agricultural Research Station, Ishurdi, Pabna during the growing seasons of 2001-2002 and 2002-2003, respectively. The two factor experiment was set up following the Randomized Complete Block Design (RCBD) with three replications. The experiment comprised seven planting times viz., i) September 1 ii) October 1 iii) November 1 iv) December 1 v) January 1 vi) February 1 and vii) March 1 and four genotypes of pointed gourd viz. i) PG001 ii) PG003 iii) PG020 iv) PG025.Thus, there were 28 treatment combinations (7 x 4) of the study. The unit plot size was 1.25 m x 4.0 m and plant spacing was 1.0 x 1.25 m. Manures were applied at the rate of 10 ton cowdung and 500 kg mustard oil cake per hectare. Fertilizers were applied at the rate of 150, 125, 100, 120 kg/ ha urea, TSP, MP and gypsum, respectively. The whole amount of cowdung, mustard oil cake, TSP and gypsum was applied as basal dose during pit preparation. Urea and MP were applied as top dressing in three equal installments at 20, 60 and 90 days after emergence of the crop. The plants were grown on bamboo trellis of one meter in height. Irrigation and other intercultural operations were done as and when necessary. Data on days to sprouting, survival percentage (%), date of 1st harvest, vine length at 1st harvest, number of nodes at 1st harvest, fruit length, fruit width, single fruit weight, number of fruits per plant, weight of fruits per plant and yield were recorded and statistically analyzed.

Results and Discussion

Planting time significantly influenced the different yield contributing characters and yield of pointed gourd (Table 1). December 1 planting took the maximum days for sprouting followed by January 1. On the other hand, March 1 planting required the minimum time for sprouting of the cuttings. Both early and late plantings produced early sprouting of cutting, which might be due to favourable temperature before and after the winter months. Nath *et al.* (1976) reported that pointed gourd prefers warm and humid climate and remains dormant during winter season. Singh and Whitehead (1999) also reported that pointed gourd vines used to sprout earlier from over-wintered roots during subsequent year in spring when the average soil temperature reached above 12.5^{0}C. The highest percentage of cutting survivability was observed from October 1 planting followed by September 1 planting. The lowest survivability of cutting was found in December 1 and January 1 planting. This might be due to the death of the vines or sprouts because of low temperature during the winter months. September 1 planting took the maximum days to first harvest of the fruit and March 1 planting took the minimum days for first harvest of fruit. The highest fruit yields per plant and per hectare were recorded from October 1 planting. On the other hand, the lowest fruit yields per plant and per hectare were recorded from March 1 planting. There was a trend of decrease in yield with the advancement of planting date from October 1 to March 1. It means that delay in planting time decreases the fruit yield per plant and per unit area in pointed gourd. But in case of October 1 planting, the harvest of fruits is done after six months and the land remains occupied for more than six months without any return. On the other hand, in case of March 1 planting, first harvest of fruits was done after 83 days *i.e* less than three months of planting of the crop. Therefore, a grower can cultivate vegetables like potato, radish etc as an additional crop in his land if he wants to plant pointed gourd in March rather than October. However, in case of October planting, the higher market price of the early crop can compensate the time and land needed. Planting of pointed gourd in October-November with other vegetables as relay or intercrop may be an alternative to save the time and land. Also raising of cuttings in poly bags or in nursery may be suggested for planting during February-March to save the time and land required for early planting. Under Indian conditions, Choudhury (1992) suggested to plant rooted cuttings of pointed gourd during February-March. Also for selecting the best planting time, details calculation of the cost of cultivation for different planting time is needed.

Table 1. Effect of planting time on the growth and yield of pointed gourd (pooled data of 2001-2002 and 2002-2003)

Planting time	Days to sprouting	Survivability (%)	Days to 1st harvest	Vine length at 1st harvest (m)	No. of node at 1st harvest	Fruit length (cm)	Fruit width (cm)	Average fruit wt. (g)	No. of fruit/ plant	Fruit yield/ plant (kg)	Yield (t/ha)
September	20	62.59	195	2.67	45.20	10.48	3.74	38.89	208	7.55	19.00
October	21	64.67	180	1.94	33.18	11.30	3.88	39.46	322	11.87	29.50
November	26	61.68	161	1.40	28.91	10.77	3.69	38.23	293	9.72	24.32
December	33	42.82	140	1.26	24.50	10.64	3.68	36.891	179	6.48	16.18
January	29	44.94	113	1.56	36.51	10..55	3.62	36.31	167	5.97	14.97
February	18	54.77	87	2.26	42.28	10.54	3.55	35.83	165	5.95	14.77
March	16	57.30	83	2.28	42.82	10.53	3.50	34.24	131	4.64	11.50
LSD (.05)	0.88	0.86	2.11	0.08	1.61	0.09	0.19	1.83	23.65	0.27	0.61
LSD (.01)	1.17	1.18	2.78	0.11	2.13	0.13	0.26	2.42	31.25	0.38	0.81
CV(%)	6.50	2.81	2.69	8.13	7.75	3.29	4.69	8.59	9.62	6.30	5.72

The pointed gourd genotypes differed significantly for all the parameters studied (Table 2). Genotype PG020 took the maximum days (29 days) for sprouting followed by PG001 and PG003 whereas PG025 took minimum days (20 days) for sprouting. The highest survivability of cutting was found in PG025 (61.48 %), while the lowest survivability (48.15 %) was observed in PG020. PG025 appeared to be early in fruiting and took the minimum days (129 days) to first harvest. On the other hand, the genotype PG-001 took the maximum days (146 days) to first harvest. The highest yields of fruit per plant (8.99 kg) and per hectare (20.80 tons) were recorded in the genotype PG025 whereas the lowest yields of fruit per plant (7.51 kg) and per hectare (14.96 tons) were recorded in the genotype PG003. The genotype PG025 produced nearly one and half times higher yield than PG003. Choudhury reported that Bengal-Assam area is the centre of origin of pointed gourd. Therefore, wide variation among the genotypes in respect of different yield contributing characters and yield are quite expected. The results of the present study are *at par* with the findings of Shanmugavelu (1989) who reported wide variation among the pointed gourd genotypes for different yield contributing characters and yield. Khan (2006) while working with 64 genotypes of pointed gourd also reported wide variations among the genotypes both at morphological and molecular levels.

Table 2. Effect of genotype on the growth and yield of pointed gourd (pooled data of 2001-2002 and 2002-2003)

Genotype	Days to sprouting (day)	Survivability (%)	Days to 1st harvest	Vine length at 1st harvest (m)	No. of node at 1st harvest	Fruit length (cm)	Fruit width (cm)	Fruit wt. (g)	No. of fruit per plant	Yield of fruit plant(kg)	Yield (t/ha)
PG001	24	54.27	146	2.09	37.27	11.85	3.54	40.17	182	8.00	18.63
PG003	21	57.99	138	1.74	36.30	8.70	3.35	21.56	270	7.51	14.96
PG020	29	48.15	135	1.54	32.60	11.66	3.83	45.26	184	8.33	20.05
PG025	20	61.48	129	2.27	37.65	10.56	3.96	41.50	202	8.99	20.80
LSD (.05)	0.89	0.68	2.10	0.08	1.61	0.09	0.19	1.83	23.63	0.27	0.61
CV %	6.50	2.81	2.69	8.13	7.75	3.29	4.69	8.59	9.62	6.30	5.72

The combined effects of planting time and genotype on yield contributing characters and yield of pointed gourd are presented in Table 3. PG020 took the maximum days to sprouting (38 days) when planted in December 1 and significantly different from other treatment combinations. PG025 took the minimum days to sprouting (12 days) when planted in the month of March 1. The highest cutting survivability (72.24 %) was found when PG025 was planted in the month of October 1. The lowest survivability of cutting (35.80 %) was observed in PG020 when planted in December 1. PG001 took the maximum duration (201 days) when

planted in the month of September 1, whereas PG-025 took the minimum duration (77 days) when planted in March 1.The highest length of vine (3.71 m) was observed when PG025 was planted in September 1. The highest fruit length (12. 75 cm) was recorded by PG-001 when planted in October 1. The maximum fruit width (4.38 cm) was noticed in PG025 when planted in October 1 and the minimum (3.06 cm) in PG003 when planted in March 1. The genotypes PG003 and PG025 produced the highest number and weight of fruits per plant (404 and 13.91 kg), respectively when planted in October 1. PG001 and PG-003 produced the lowest number and weight of fruits per plant (105 and 3.60 kg), respectively when planted in March 1. The highest yield per ha (35.45 t/ha) was recorded in PG-025 when planted in October 1 and the lowest yield (9.00 t/ha) was obtained from PG-003 when planted in March 1.Yield of fruits declined in all the genotypes with delay in planting after October. October planting appeared to give higher yield in case of all the genotypes compared to February and March planting though land remains occupies for about six months more compared to March planting.

Table 3. Combined effect of planting time and genotype on the growth and yield of pointed gourd (pooled data of 2001-2002 and 2002-2003)

Planting time x Genotype	Days to sprouting	Survivability (%)	Days to 1st harvest	Vine length at 1st harvest (m)	No. of node at 1st harvest	Fruit length (cm)	Fruit width (cm)	Fruit wt. (g)	No. of fruit per plant	Total wt. of fruit per plant (kg)	Yield (t/ha)
Sept x PG001	20	60.17	201	1.69	35.45	11.87	3.60	40.24	173	7.14	17.64
Sept x PG003	18	65.18	201	1.77	36.40	8.89	3.28	20.21	265	6.07	15.18
Sept x PG020	24	53.80	193	1.86	36.00	12.18	3.89	43.03	188	8.42	21.76
Sept x PG025	18	67.55	186	3.71	63.46	11.57	3.78	39.85	208	8.58	21.43
Oct x PG001	20	62.11	186	1.59	33.33	12.57	3.53	34.15	288	12.06	29.65
Oct x PG003	21	68.95	185	1.67	35.55	8.95	3.60	22.99	404	9.08	22.66
Oct x PG020	26	55.39	179	1.12	30.00	11.42	3.71	48.23	275	12.43	30.25
Oct x PG025	18	72.24	171	2.06	33.85	10.18	4.38	38.59	339	13.92	35.45
Nov x PG001	26	62.11	173	1.50	27.20	12.17	3.51	41.07	198	8.08	20.15
Nov x PG003	25	64.86	161	1.53	30.95	8.72	3.53	22..96	386	7.45	18.58
Nov x PG020	33	54.10	158	1.11	27.50	11.95	3.78	46.96	264	10.61	26.86
Nov x PG025	21	69.29	152	1.45	30.00	10.71	4.20	41.73	305	12.73	31.69
PG001x Dec	34	45.23	150	1.47	27.03	11.98	3.39	37.57	183	4.42	10.98
Dec x PG003	32	47.12	143	1.35	26.03	8.71	3.42	22.06	224	5.45	13.56
Dec x PG020	38	35.80	142	1.01	21.50	12.28	4.17	45.13	138	5.59	13.98
Dec x PG025	28	46.34	126	1.21	23.43	10.07	3.98	41.14	125	6.43	15.87
Jan x PG001	31	40.41	118	2.15	43.38	11.78	3.46	42.16	169	6.81	16.99
Jan x PG003	29	44.08	115	1.87	36.83	8.68	3.32	21.42	232	5.16	12.88
Jan x PG020	34	39.25	113	1.68	31.05	11.54	3.72	45.75	138	6.35	16.18
Jan x PG025	24	51.00	107	1.85	34.80	10.35	3.93	42.94	138	6.11	15.33
Feb x PG001	19	53.56	101	2.91	49.68	11.71	3.57	43.21	159	7.50	18.72
Feb x PG003	16	56.98	80	1.92	46.06	8.47	3.19	21.09	221	5.12	12.80
Feb x PG020	23	47.86	84	1.86	36.33	11.15	3.68	44.03	150	6.55	16.56
Feb x PG025	13	60.66	84	2.44	37.06	10.55	3.79	42.43	152	5.59	13.83
Mar x PG001	16	56.31	91	3.32	50.35	10.81	3.69	42.79	105	6.53	16.24
Mar x PG003	14	58.73	84	2.08	49.26	8.46	3.06	20.18	155	3.61	9.00
Mar x PG020	21	50.84	80	2.15	40.28	11.08	3.85	43.69	134	6.03	14.72
Mar x PG025	12	63.31	77	3.11	40.9	10.45	3.65	43.83	146	4.92	12.03
LSD (.05)	1.77	1.79	4.21	0.16	3.22	0..39	0.19	3.66	47.3	0.54	1.22
CV (%)	6.50	2.81	2.69	8.13	7.75	3.29	4.69	8.59	9.62	6.30	5.72

To the farmers, land is the most valuable asset and they want to use their land in most economic way to grow more crops within shortest possible time. In the present study, it appears that the genotype PG025 gave higher yield during early planting while the genotype PG001 gave comparatively higher yield during late planting (Table 3). Therefore, the farmers may have their choice for genotype for early and late planting to grow pointed gourd for early and late crop. However, for wider use of the findings, multi-location trial using different times and genotypes is suggested. Also calculation of cost of cultivation for different planting times and genotypes are suggested to select an optimum planting time and genotype for commercial production of pointed gourd in a particular area.

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