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Effect of Time of Corm Lifting on Gladiolus Production

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Abstract: Effects of seven different corm lifting dates viz. 30, 45, 60, 75, 90, 105 and 120 days after flowering (DAF) were investigated to determine the optimum time of corm lifting in gladiolus. Different treatments had no significant effect on the number of corms and cormels per plant but individual corm weight, diameter of corm and weight of cormels per plant were significantly influenced by different treatments. These parameters were found to increase with increase in lifting dates except the treatment 120 DAF in case of weight of cormels per plant. When the corms were stored at normal room temperature, different treatments showed insignificant variation in the incidence of corm rot disease. Corms lifted at 30 DAF though showed higher percentage of weight loss and less reduction in diameter during storage, it did not differ significantly with other treatments in the productivity of gladiolus when planted in the following year.

Key words: Gladiolus, corm, lifting time and production, corm lifting, cormels

Introduction

Gladiolus is one of the most important cut flowers in the world. In Bangladesh, it is a popular commercial flower. Its demand is increasing day by day due to its colour variety, attractive spikes and prolonged vase life. Normally, growers use corms in growing their crops. Harvesting time of corms is very much important for obtaining good quality propagules. It should be collected at proper stage of maturity. Corms harvested earlier may be subjected to loose their viability whereas that stay long in the field tends to rot through time.

Growers normally harvest the daughter corms when the leaves are brown and wilted. Actually, this practice is wasteful because there is no authentic information to harvest the corms at this stage. Scientists have difference in opinion about the time of corms lifting. Arora (1992) has suggested that corms and cormels are ready for lifting after 6-8 weeks of harvest of spikes. On the other hand, Singh *et al*. (1987) found that the best time for lifting the corms from the soil is when all leaves are completely dried up. Prasad and Kumar (2000) observed that after flower harvest the corms are allowed to remain in the ground until they mature. This may be from 4 to 10 weeks after the flowers are cut. Singh *et al*. (1995) also observed that the corm rottening increased due to delay in lifting corms after flowering. If the corms can be lifted in earlier, it will reduce the crop duration and corm rottening as well. Instead, the land may be utilized for growing other crops during gap period. Such type of work was not done before under Bangladesh condition. Therefore, the present investigation was undertaken to determine the optimum time of corm lifting in gladiolus.

Materials and Methods

The experiment was carried out at the central research farm of the Horticultural Research Centre, BARI, Gazipur during 1998-2001. Seven different times of corm lifting viz. 30, 45, 60, 75, 90, 105 and 120 days after flowering (DAF) were studied as treatments in the experiment. The experiment was replicated four times in RCB design. Uniform sized corms (3.5-4.0 cm dia.) were planted at a depth of 6 cm. The unit plot size was 1 x 0.9 m^2 and spacing was maintained at 25 cm from row to row and 15 cm from plant to plant. The experimental land was prepared with deep ploughing and fertilized at the rate of 30 tons, 150, 225 and 130 kg of cowdung (CD), urea, triple super phosphate (TSP) and muriate of potash (MP) per hectare, respectively. Cowdung, TSP and MP were applied as basal and urea was top-dressed in two equal splits at 4-leaf stage and spike initiation stage. The corms of commonly cultivated red variety (GL-013) were planted on 26/10/1998 and 12/11/1999. The flowering stage was adjusted when basal floret of the spike shows colour. Corms and cormels were lifted as per treatments during February 17 to May 18 in 1999 and March 6 to June 4 in 2000. Soon after lifting, corms were properly cleaned. These were then bagged in perforated nylon bag and stored in normal room condition. Corms harvested earlier got longer storing period whereas shorter storing period was required in late harvested corms. The observations on the loss of weight and diameter of corms were recorded for 180 days intervals for each treatment. The stored corms were then planted on November 19, 1999 and November 15, 2000 to observe their productivity. The corms were then harvested 90 days after flowering.

Results and Discussion

Different lifting dates had no significant influence on the number of corms per plant but the weight and diameter of corm differed significantly due to different treatments (Table 1). It was observed that the weight and diameter of corm were gradually increased with increased lifting dates from 30 to 120 DAF. However, lifting of corms at 90, 105 and 120 days after flowering were at par with each other regarding these two parameters. It might be due to the fact that growth and development of corm takes place in a regular manner. Corm completes its growth and development at 90 DAF and maintains it over after 120 DAF. Singh *et al*. (1995) also reported an increase in corm weight and diameter with increasing lifting dates.

Number of cormels per plant was not significantly influenced by different treatments. It indicated that 30 DAF completes initiation of cormel primordia and further increase does not occur under Bangladesh condition. However, the number of cormels were reduced after 60 DAF which may be due to the rottening of newly developed cormels by rainfall or any other reason. On the other hand, weight of cormels produced per plant was significantly influenced by different lifting dates and a gradual increase was observed with increasing dates up to 105 DAF. There was a reduction in the weight of cormels per plant at 120 DAF which may be due to reduced number of cormels resulting from cormel rottage with excess moisture from rainfall. However, the treatments of corm lifting at 75, 90, 105 and 120 DAF were found statistically at par with each other. Increased cormel weight with increase in lifting dates was also reported by Singh *et al*. (1995).

At the time of lifting, no corms were affected by corm rot disease. But in storage condition, corm rottening was observed and the variation was not significant. When corms lifted at 30 DAF, rottening percentage was 9.34 which was gradually decreased up to 1.39 at 105 DAF. This may be due to the proper maturity of the corms with increasing lifting dates. At 120 DAF, the incidence of corm rot disease was further increased up to 15.68%. This may be due to the higher water absorbance by the corms resulting from rainfall. These results are in agreement with the findings of Singh *et al*. (1995); Singh and Ramachandran (1997).

During storage, weight loss of corms was greatly influenced by

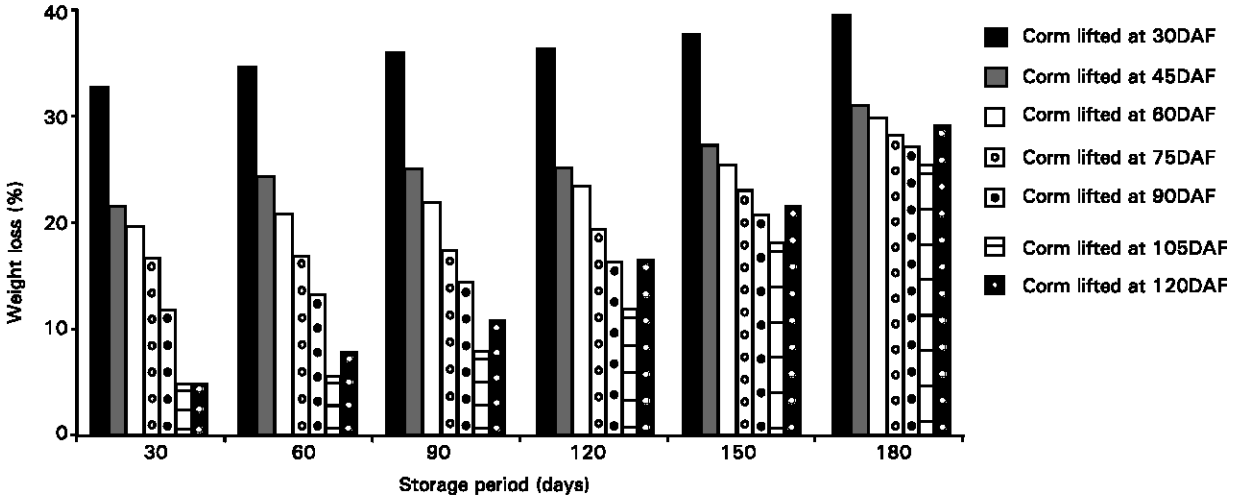

Fig. 1: Weight loss of corms during storage

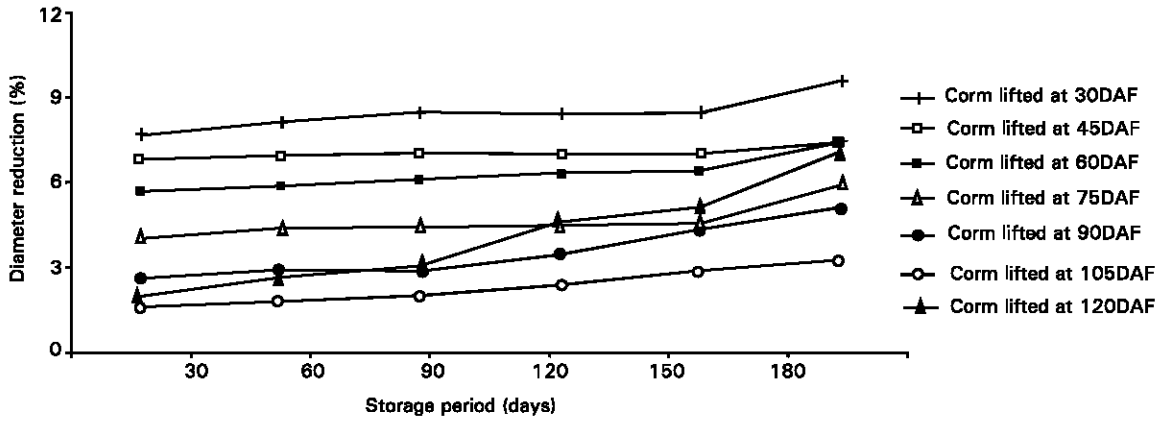

Fig. 2: Diameter reduction of corms during storage

Table 1: Effect of days to lifting of corms after flowering on the yield of corms and cormels and incidence of corm rot disease in gladiolus cv. GL- 013 (mean of two years)

Corms lifted (DAF)	Number of corms/plant	Individual corm weight (g)	Corm diameter (cm)	Number of cormels/plant	Weight of cormels/plant	Corms infected with corm rot disease (%)	
						At the time of lifting	After storage
30	1.45	11.32c	3.22c	19.85	15.40d	0	9.34 (2.85)
45	1.45	12.81bc	3.39bc	20.95	20.35cd	0	7.51 (2.60)
60	1.60	12.84bc	3.45bc	21.55	23.45bc	0	7.04 (2.46)
75	1.45	12.94bc	3.45bc	18.35	25.40abc	0	6.88 (2.50)
90	1.63	14.41ab	3.58ab	18.03	29.75ab	0	3.12(1.43)
105	1.55	15.83a	3.63ab	18.13	30.35a	0	1.39(1.15)
120	1.77	16.47a	3.75a	15.18	24.95abc	0	15.68 (3.64)
Level of significance	NS	0.01	0.01	NS	0.01	-	NS
CV (%)	13.5	13.20	4.55	11.10	12.63	-	55.41

Figures in parenthesis indicate the transformed values at the original.
NS= Not significant

Table 2: Performance of corms on the productivity of gladiolus when harvested at different dates after flowering (mean of two years)

Corms lifted (DAF)	Days to 50% plant emergence	Days to 50% spike initiation	No. of flowers/ plant	Spike length (cm)	Rachis length (cm)	Single stick weight (g)	Flower diameter (cm)	Flower length (cm)	No. of corms/ plant	Individual corm weight (g)	Corm diameter (cm)	No. of cormels/ plant	Weight of cormels/ plant (g)
30	14.75	90.50	11.12	81.90	41.69	56.38	7.31	10.72	1.40	11.85	3.43	13.11	18.26
45	14.50	85.00	11.83	80.97	41.54	57.10	7.50	11.00	1.52	12.12	3.47	13.48	22.06
60	14.50	86.75	13.13	81.98	41.67	59.34	7.58	11.10	1.83	13.11	3.55	14.54	23.11
75	14.25	85.50	13.50	82.82	43.17	63.58	7.74	11.28	1.89	13.38	3.55	16.03	25.49
90	13.75	84.75	13.55	83.61	44.01	63.07	7.67	11.88	1.87	13.78	3.67	17.08	26.81
105	12.25	83.25	13.60	83.59	44.00	63.41	7.90	11.93	1.99	14.85	3.63	16.75	21.78
120	12.00	80.75	13.65	84.32	44.88	63.37	7.90	11.91	1.92	15.35	3.67	16.34	17.74
Level of significance	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CV (%)	19.40	4.96	5.30	5.50	7.80	16.70	5.00	3.00	20.90	16.10	5.60	25.30	27.00

NS = Not significant

different lifting dates. After 30 days of storage, the higher weight loss of corms were recorded in corms lifted at 30 DAF and it was gradually decreased up to corms lifted at 105 DAF (Fig. 1). The same trend was found in different storing periods. The higher rate of weight loss was recorded in the lower lifting dates which may be due to the immaturity or improper development of the corms. On the other hand, the weight loss of corms was again found increased when the corms were lifted at 120 DAF. Diameter reduction of corms also followed similar pattern to that of weight loss during storage (Fig. 2). This might be due to the shrinkage of corms through water loss with the increase in storage period.

The stored corms lifted in different dates had no significant influence on days to 50% plant emergence and spike initiation, number of flowers per plant, length of spike and rachis, weight of single stick, flower size, corm and cormel production of gladiolus (Table 2). However, there was an increasing trend in most of the parameters studied in the stored corms lifted in different dates except 120 DAF. This may be due to any physiological disorder by excess moisture or any other stress condition at 120 DAF treatment. Mishra and Singh (1998) and Negi *et al.* (1994) also reported similar results.

From the present study, it was observed that there was no significant variation in the productivity of stored corms lifted in different dates. Thus, corms can be harvested earlier i.e. 30 days after flowering without affecting its productivity. This finding was in agreement with the findings of Ladilad (1997) and was partially similar with the findings of Singh and Ramachandran (1997). They suggested that the optimum time for lifting the corms was 45-60 days after flowering. Parthasarathy and Nagaraju (1999) also found that the optimum time for lifting of corms was 45-55 days after flowering.

In overview of the results, the treatment 30 DAF may be considered as the optimum harvesting time of gladiolus in Bangladesh condition.

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