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Effect of Different Sowing Times on The Performance of Dahlia (*Dahlia variabilis*)

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Abstract: Highly significant results were obtained when a local dahlia variety was tested on four sowing dates at fortnightly interval, starting from 10th of September. Its performance was judged for seed germination time, plant height, days to flower, blooming period, flower size and seed yield/replication. Seed sowing of 25th of September took five days to germinate, which was a minimum time. All the other characters studied varied with sowing time. The best sowing time recommended is 25th of September. Availability of Dahlia flowers can be preplanned by adjusting the sowing time.

Key words: Seed germination time, plant height, days to flower, blooming period, flower size and seed yield

Introduction

Aziz (1986) explained that Dahlia seed is sown during May to August and February to March in plains and hilly areas of Pakistan where it flowers during September to November and July to November, respectively. Dahlia seeds germinate in one to four weeks at 20-30 degree centigrade (Hartmann and Kester, 1989).

Mishra *et al.* (1990) evaluated seven *D. variabilis* (*D. pinnate*) cultivars for plant height, days to full bloom, flower quality, flower site and found that the Kenya and Vigour cultivars were superior in plant height and flower size. Flower longevity on the plant was the best in Kenya (13.3-15.5 days) followed by Kelvin, black-out and vigour. Khan and Khan (1991) explained that Dahlia seed can be sown throughout the year in Pakistan which germinate in 8-10 days but severe winter or summer may be harmful to it. Its flowering can be enjoyed during spring in warm areas and during late summer or autumn in cold areas. Ayub (1994) suggested that Dahlia seed should better be sown during the months of August/September for good flower harvest. No systematic research is reported from Pakistan on this beautiful flower. The present studies were first of a series of experiments planned to fill-in-this gap area, and to dig-out the best sowing time for maximum quality flower production in Rawalpindi/Islamabad,

Materials and Methods

These studies were conducted with a local Dahlia variety in 1994 to 1996 at the Horticultural Research Institute for Floriculture and Landscaping, Murree Road, Rawalpindi. Dahlia seedlings were raised in pots on four different dates at fortnightly interval starting from 10th of September, and eventually transplanted to the field by keeping plant-to-plant and row-to-row distance of 1.6 feet. The sowing dates were considered as treatments and each treatment was replicated four times taking two seedlings per replication.

Four sowing dates were: $T_1 = 10$ September;
 $T_2 = 25$ th September
 $T_3 = 10$ th October;
 $T_4 = 25$ th October

The experiment was laid-out according to randomized compete block design as described (Steel and Torrie, 1981). Following data were recorded for two years and pooled for statistical analysis:

1. **Seed germination time (days):** Time taken from sowing to the start of germination.
2. **Plant height (cm):** From ground to the top of the highest branch.
3. **Days to flower:** It was recorded from seed sowing to the anthesis of first flower.
4. **Blooming period (Days):** The period between first and last flower openings.
5. **Flower size (sq.cm.):** It is the area of a flower calculated by using the formula $(3.14 \times r^2)$: where r is the radius which was noted by dividing the diameter by 2. The diameter was measured by drawing a circle around the flower, i.e. circumference at least from 3 sides.
6. **Seed yield/replication (gms):** It is the weight of seed produced from all the flowers of each replication.

Results and Discussion

Results obtained were highly significant for all the six characters studied (Table 1, 2).

Seed germination time (days): Minimum germination time noted was of 5 days in T_2 treatment (sown on 25th of September) which was significantly different from other treatments (Table 1). The maximum of 8.38 days was taken by the last sowing, the T_4 treatment (sown on 25th of October). The 30 days difference in seed sowing time could hardly made 3 days difference in seed germination. The Table 2 shows that Dahlia has wide temperature regime for seed germination with an optimum temperature of 25.9 degree centigrade at which the seeds germinated quickly. Seed germination was delayed for one day when sown 15 days earlier or after the average sowing time which was 25th of September in this experiment. At 20 degree centigrade seed took 8 days to germinate. These results corroborate Hartmann and Kester (1989) who mentioned that seed germinate in one to four weeks at 20 to 30

Table 1: Comparison of different characters as affected by treatments

Treat-ment	Seed Yield Germination	Seed Height (cm)	Plant Flower	Days to Period (Days)	Blooming Size (sq.cm.)	Flower /Replication (gms)
T ₁	6.88+0.65*B**	55.79+9.7113	185.00+1.84C	93.25+13.46A	33.59+0.516	6.50+0.61C
T ₂	5.00+60.35A	81.10+3.93A	170.63+4.298	108.50+13.46A	66.61+14.55A	11.13+0.74A
T ₃	6.75+0.258	73.61+1.34AB	172.88+1.24B	92.13+1.08A	58.22+1.99A	8.75+0.75A
T ₄	8.38+0.420	61.03+11.54B	159.88+2.16A	56.75+3.758	40.37+4.16B	5.88+0.65C

* = Standard Deviation

** = LSD at 5 % level of probability.

Table 2: Treatment comparison for temperature and blooming period

Treatment	Sowing time	Average temperature at sowing (Degree Centigrade)	Blooming period
T ₁	10th September	28.9	15th March to 16th June
T ₂	25th September	25.9	15th March to 30th June
T ₃	10th September	24.3	8th April to 9th July
T ₄	25th September	19.9	24th April to 18th June

degree centigrade. Khan and Khan (1991) did not specify the best sowing time of the year, but generalized the germination time of 8 to 10 days. Seed germination time also influenced the other characters studied. Quickly germinated seed produced good quality crop and flowers. Those seeds which took longer time to germinate, produced low quality crop and remained behind in characters studied compared with quickly germinated seeds.

Plant Height (cm): Plant height looks like the catchment of favourable weather conditions. The T₂ treatment which germinated quickly continued vigorous plant growth as compared to other treatments. The maximum plant height of 81.1 cm was achieved by T₂ treatment followed by T₃ (73.61 cm), and among them a non-significant difference was present. Seed germination time and plant height showed positive relationship. As the seed germination time was delayed, a correspondence decrease in plant height was noted in each treatment. Good stand crop also produced large sized flowers and a decrease in flower size was noted with a correspondence decrease in plant height (Table 1).

Days to Flower: The minimum days (159.88) taken for flower emergence were recorded when the seed was sown on 25th of October (T₄), and was significantly different from other treatments. The maximum of 185 days were taken by the first sowing made on 10th of September (T₁). The T₂ treatment which remained as the best sowing time for all the characters studied took 171 days to flower and remained in blooming for 108 days (Table 2). The crop sown on first two sowing started flowering from the middle of March while the crops sown on last two dates commenced flowering on 8th and 24th of April, respectively (Table 2). The reason of grouping for flower initiation between the first two sowing dates and the last two sowing dates could be judged from the one month normal temperature available for vegetative growth to September sown crops when the temperature remained

above of 20 degree centigrade upto middle of October. The October sown crops faced the onset of low temperature which checked their vegetative growth and the rise of temperature helped them in completing the vegetative phase before they could enter into reproductive phase in March.

Blooming period (days): The longest flowering period of 108.5 days was observed when seed, was sown on 25th of September (T₂) followed by T₂ and T₃ with mean values of 93.25 and 92.13 days, respectively. All these treatments remained at par with each other when tested statistically. The last sowing, T₄ remained in flowering for 56.75 days only as the hot weather received its blooming period. It seems that the longer vegetative growth period influenced this character as the shortest growth period was available to the last sowing (T₄) due to which less quantity of food was manufactured and preserved/stored in the plants which was consumed in short period. September sown crops started flowering amid of March but the crops sown on 10th of September completed flowering two weeks earlier than the 25th of September sown crop (Table 2). Again the October sown crops started simultaneous blooming in April but the 25th October sown crop completed flowering one month earlier. It can be concluded that the 25th September sown crop which remained in blooming for longer period is the best sowing time for flower production. These results are in accordance with the results reported before (Aziz, 1986).

Flower size (sq.cm.): The T₂, 25th September sowing, crop produced good looking larger size flowers, their size being 66.61 sq.cm. (Table 1). Flower size of T₃ treatment was 58.22 and it was at par statistically with T₂. The treatments T₄ and T₁ produced flowers of smaller size and these two sizes were statistically non-significant with each other. This character seems related to plant height. Well built plants produced heavy flowers and as the plant height was reduced, a correspondence decrease in flower size was

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noted (Table 1). These results are comparable to those mentioned as 19.63 -44.18 sq.crh. (Moore *et al.*, 1985).

6. Seed yield/replication (gms): Increase in seed yield showed a positive relationship with other characters studied. Seed yield was maximum in T₂ treatment which was 11.13 gms followed by T₃ treatment with a value of 8.75 gms. The minimum yield of 5.88 came from T₄ treatment sown on 25th of October. Increase in seed yield could have come from blooming period and flower size. A better flower size produced higher seed yield and when a plant remained in blooming for longer period the seed set was better in weight. Number of flowers could have been produced more in the treatment Which gave better yield. This research aspect will be explored in coming year.

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