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Correlation Studies in Spray Chrysanthemum (*Chrysanthemum morifolium* Ramat.) under Polyhouse and Open Field

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Abstract

Correlation analysis was carried out on 15 diverse genotypes planting over three dates of planting separately in same lay out under polyhouse and open field during two winter seasons of 2003-05 for growth and yield parameters of the genotypes of spray chrysanthemum. The results reveal that the estimate of correlation for inter-association of the parameters was found to be more pronounced in open field observation than polyhouse. The most of the growth and yield parameters showed highly positive correlation among themselves. Both in polyhouse and open field flower yield, flower size and flower stalk length were positively correlated with most of the growth parameters. Therefore, it can be concluded that to increase yield and size and stalk length of flowers the genotypes have to produce better plant growth.
Key words : Chrysanthemum, Correlation, Polyhouse, Open field.

Chrysanthemum (*Chrysanthemum morifolium* Ramat.) also known as Queen of East belongs to the family Asteraceae is one of the leading crops among the important commercial flowers in the world trade of flower crops. Among the two types of chrysanthemum viz. standard and spray types, the spray chrysanthemums have a wide acceptability and better prospect in flower trade. A knowledge of inter-relation among yield components and horticultural traits is important in selecting genotypes for higher yield. Since the phenotypes correlation measurements are highly subjected to the influence of environment hence to get the true idea of correlation it is essential to carry out the correlation studies on the pooled data obtained by planting the genotypes under different environments. In the present study, an attempt was made to assess the association between the component characters and their relation towards the yield characters with 15 genotypes planting over three date of planting each under polyhouse and open field condition.

Methods

The experiment was carried out during the two consecutive winter seasons of 2003-05 at Horticultural Research Station, Mondouri (23° N, 83° E and 9.75 m altitude), Bidhan Chandra Krishi Viswavidyalaya, Nadia, West Bengal, India. The soil texture was clay loam having pH 6.8, organic carbon 0.58, total N 156.8 kg/ha, available P_2O_5 50.4 kg/ha and available K_2O 208.5 kg/ha. Fifteen genotypes viz.Amal, Sarad Mala, Kundan, Kelvin Victory, Nanako, Red Gold, Kelvin Brisk, Tata Red, Arati, Jaya, Yellow Anemone, White Anemone, Aditi, Lokenath and Apsara Violet were planted in polyhouse and open field separately each under three dates of plantings viz. 15 July, 30 July and 15 August. The three N-S oriented polyhouse were used measuring each of 20 m length, 5 m wide, 4 m height and the thickness of UV stabilize polythene was 200 micron. Individual plot size was 1 m × 1 m and plants were transplanted at spacing 25 cm × 25 cm. Each plot received with the recommended dose of fertilizers of N : P : K at 20 : 10 : 10 g/sq/m and FYM 5 kg/sq m in both years of experiment. All the agronomic practices were followed to raise a good crop. The observations were recorded on various growth and yield parameters and subjected to statistical analysis following the procedure outlined by Sukhatme and Amble (1).

Table 1. Correlation of different phenotypic parameters under polyhouse condition.

Variable	Plant height	TLA/ plant	No. of branches/ plant	Days req to FBE	Days req to bloom	Flower size	Flower stalk length	No. of flower/ plant	Flower weight (g/plant)	Vase life
Plant height	1.00	0.35	0.05	0.29	0.53*	0.68*	0.83*	0.01	0.39	0.29
TLA / plant		1.00	0.84*	0.71*	0.72*	0.33	0.40	0.75*	0.39	–0.03
No. of branches/plant			1.00	0.51	0.47	0.07	0.17	0.76*	0.48	0.17
Days req to FBE				1.00	0.81*	0.58*	0.36	0.58*	0.60*	0.28
Days req to bloom					1.00	0.56*	0.55*	0.50	0.46	0.28
Flower size						1.00	0.65*	0.39	0.59*	0.54*
Flower stalk length							1.00	0.46	0.53*	0.11
No. of flower/plant								1.00	0.79*	0.14
Flower weight (g/pl)									1.00	0.29
Vase life										1.00

Results and Discussion

Polyhouse

The results of the phenotypic correlations in polyhouse condition presented in Table 1 revealed that a positive significant correlation existed between the traits plant height, days required to flowering, size of flower and flower stalk length. While the trait total leaf area per plant was in positive association with branch number per plant, days required to flower bud emergence (FBE), days required to attain optimum bloom and flower number per plant. Days required to FBE also exhibited significant positive correlation with days to attain optimum bloom, flower size, flower number per plant and flower yield (g/plant). Again, days to attain optimum bloom recorded a significant positive association with the characters flower size and flower stalk length. Branches per plant and flower number per plant showed significant positive association among themselves. Similar observation was noted among the traits flower number per plant and flower yield per plant. Significant positive correlation was obtained between the flower size flower stalk length, flower yield and vase life.

Open Field

Table 2 indicates positive significant correlation at phenotypic level among both among both the floral and vegetative parameters in the open field conditions. Plant height was in positive significant correlation to days required to FBE, days required to optimum bloom, flower size and flower stalk length. The traits branches per plant, days to FBE, days to optimum bloom and flower number per plant were positively influenced by total leaf area per plant.A significantly positive correlation existed between days to FBE and all flowering parameters (i.e. days to opti-

Table 2. Correlation of different phenotypic parameters under open field condition.

Variable	Plant height	TLA/ plant	No. of branches/ plant	Days req to FBE	Days req to bloom	Flower size	Flower stalk length	No. of flower/ plant	Flower weight (g/plant)	Vase life
Plant height	1.00	0.04	–0.05	0.59*	0.68*	0.81*	0.67*	0.01	0.39	0.29
TLA/plant		1.00	0.80*	0.60*	0.63*	0.33	0.45	0.75*	0.39	–0.03
No. of branches/plant			1.00	0.32	0.39	0.24	0.35	0.76*	0.48	0.17
Days req to FBE				1.00	0.84*	0.78*	0.67*	0.58*	0.60*	0.28
Days req to bloom					1.00	0.82*	0.70*	0.50	0.46	0.28
Flower size						1.00	0.63*	0.39	0.59*	0.54*
Flower stalk length							1.00	0.46	0.53*	0.11
No. of flower/plant								1.00	0.79*	0.14
Flower weight (g/pl)									1.00	0.29
Vase life										1.00

mum bloom, flower size, flower stalk length, flower number per plant and flower yield per plant). The trait days to flowering was significantly and positively correlated to flower size and flower stalk length. A positive significant association was noted among the traits branch number per plant and flower number per plant. Flower size was significantly influenced by the traits flower stalk length, flower yield and vase life. Among the traits flower yield was in positive association with flower stalk length and flower number per plant.

Thus it can be suggested that as plant height influenced the traits days to FBE, days to attain optimum bloom, flower size and flower stalk length, improvement in the traits can be obtained by increasing the plant height to a desirable extent. As total leaf area per plant showed a direct relationship with branch number per plant, days required to FBE, days to attain optimum bloom and flower number per plant, so the trait may be chosen for simultaneous improvement of these important traits. Significant positive association of leaf area with yield of flowers was also reported by Nair and Shiva (2) in gerbera. Positive correlation between branch number per plant and flower number per plant reveals that production of flowers can be increased by selecting for increased number of branches. This was in conformity to the results reported by Changule (3) on chrysanthemum. As a positive correlation existed between days to FBE, days to attain optimum bloom flower size, flower stalk length, flower number per plant and yield per plant, indirect selection of any one of these characters shall lead to concomitant increase in cut flower yield. Selecting genotypes with taller flower stalk length can lead to greater flower size, more yield and longer vase life as their existed a positive association among all these characters. Positive significant correlation was also observed in gerbera between the traits length of flower stalk and vase life of flowers by Nair and Shiva (2).

The estimate of correlation for inter-association of the parameters was found more pronounced in open field observation than polyhouse. The most of the growth and yield parameters showed highly positive correlation among themselves. Both in polyhouse and open field flower yield, flower size and flower stalk length was positively correlated with most of the growth parameters. Therefore, it can be concluded that to increase yield and size and stalk length of flowers the genotypes have to produce better plant growth.

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