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RESEARCH ARTICLE

CORRELATION AND REGRESSION STUDIES IN TUBEROSE (*Polianthes tuberosa* Linn.) CV. MEXICAN SINGLE

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ABSTRACT

Tuberose (*Polianthes tuberosa* Linn.) is one of the most important ornamental bulbous flower crop not only used as cut flower but also used as loose flower and extraction of essential oils. Not much work is reported for the prediction of yield in this crop. Hence, a forecasting methodology for tuberose cv. Mexican Single using growth and floral characters is suggested. Excellent relationship of floral characters such as plant height, spike length, flower diameter, etc., singly or in combination of two or three had high association with yield and these characters could help to predict the yield in tuberose to an extent of more than 80 per cent.

Key Words **:** Correlation, forecasting, regression, tuberose**.**

Tuberose (*Polianthes tuberosa* Linn.) belongs to family *Agavaceae* and native to Mexico from where it disseminated to different parts of the world during the 16th century. Tuberose popularly knwon as *Rajanigandha* in Hindi occupies a prime position among comercial ornamental bulbous crops, because of its highly fragrance flowers which can be used in various ways. It is commercially cultivated for cut flower and loose flower trade and also for extraction of its highly valued natural flower oil. The serene beauty of flower spikes, bright white flowers, sweetness of blooms and delicacy of fragrance of this ornamental crop, transform the entire area into a nectarine and joyous one. Apart from huge domestic consumption of its flowers and essential oils, it has great potential in export also. The mature plants of tuberose produce flower spike for a period of 2-3 years continuously. Each plant produces 2-18 spikes during a calendar year. Not much work is reported for the prediction of yield in this crop. But some work on yield forecasting in citrus has been reported by Shamasundaran *et al.* (1983). Further, Srinivasan *et al.* (1983) have reported forecasting techniques for brinjal and tomato yields. Through tuberose is an important crop for ornamental purposes and extraction of essential oils, no literatue is available for the estimation of yield. Hence, attempts have been made in this paper to work out a methodology for forecasting yield using vegetative growth and floral characters.

MATERIALS AND METHODS

The present experiment was conducted at the research farm of IIHR, Hessaraghatta, Bangolore. Two hundred and fifty six individual bulbs of tuberose cv.

Mexican Single, which were of uniform size and vigour were used in this study. These bulbs were planted at a spacing of 30×30 cm per plant. Uniform regular cultural operations were carried out and all the plants were maintained with uniform fertilizer and irrigation schedule. Data on plant height, number of leaves per plant, flower diameter, spike length, rachis length, flowering duration, yield in terms of number of spikes per plant and number of florets per spike were recorded as and when required. These characters were subjected to statistical analysis for being considered for their suitability for forecasting the yield. Correlation and regression analysis methods (both simple and multiple) were used as per the methodology suggested by Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

Good association of characters with yield could be seen in data presented in Table 1, 2 and 3. All the characters singly or in combination of two, three or four had shown an excellent and positive association with yield (number of spikes per plant or number of florets per spike). It is observed from Table 1 that there existed an highly significant and positive association of individual

Table 1 : Showing correlation between characters and yield (in terms of number of spikes/plant and number of florets/spike)

DC	IC	r	a	b_1	b_2	b_3	b_4	b_5	b_6	R^2
7	1	0.91**	2.05	0.96	-	-	-	-	-	82.80
	2	0.85**	4.19	-	0.87	-	-	-	-	72.00
	3	0.89**	2.79	-	-	0.91	-	-	-	80.75
	4	0.90**	3.70	-	-	-	0.87	-	-	81.00
	5	0.82**	6.24	-	-	-	-	0.84	-	67.06
	6	0.94**	2.05	-	-	-	-	-	0.92	88.00
8	1	0.91**	2.08	0.92	-	-	-	-	-	82.90
	2	0.85**	3.97	-	0.84	-	-	-	-	73.00
	3	0.87**	3.70	-	-	0.85	-	-	-	75.79
	4	0.88**	4.20	-	-	-	0.82	-	-	77.90
	5	0.79**	6.98	-	-	-	-	0.78	-	62.61
	6	0.89**	3.59	-	-	-	-	-	0.83	79.24

* Significant at 5% ** Significant at 1%
DC Dependedn Character IC Independent character
1 Plant heigh 2 No. of leaves per plant 3 Flower diameter
4 Spike length 5 Rachis length 6 flowering duration 7 Number of spikes/plant
8 Number of florets/spike

Table : 2 Showing correlation between characters and yield (in terms of number of spikes/plant)

DC	IC	r	a	b_1	b_2	b_3	b_4	b_5	b_6	R^2
7	1,2	0.92**	1.14	0.75	0.23	-	-	-	-	83.99
	1,3	0.94**	0.26	0.55	-	0.45	-	-	-	87.68
	1,6	0.93**	0.83	0.55	-	-	-	-	0.43	87.47
	2,3	0.91**	1.34	-	0.29	0.66	-	-	-	83.01
	2,6	0.91**	2.16	-	0.28	-	-	-	0.64	82.88
	3,6	0.92**	2.11	-	-	0.46	-	-	0.46	84.06
	1,2,3	0.94**	0.16	0.53	0.04	0.43	-	-	-	87.71
	1,3,6	0.94**	0.25	0.48	-	0.28	-	-	0.24	88.46
	2,3,6	0.92**	1.32	-	0.19	0.39	-	-	0.37	84.85
	1,2,3,6	0.94**	0.26	0.48	0.00	0.28	-	-	0.24	88.45

* Significant at 5% ** Significant at 1%
DC Dependedn Character IC Independent character
1 Plant heigh 2 No. of leaves per plant 3 Flower diameter
4 Spike length 5 Rachis length 6 flowering duration
7 Number of spikes/plant 8 Number of florets/spike

Table 3 : Showing correlation between characters and yield (in terms of number of florets/plant)

DC	IC	r	a	b_1	b_2	b_3	b_4	b_5	b_6	R^2
8	1,2	0.92**	1.11	0.70	0.24	-	-	-	-	84.34
	1,3	0.92**	0.80	0.63	-	0.32	-	-	-	85.58
	1,6	0.93**	0.83	0.55	-	-	-	-	0.43	87.47
	2,3	0.89**	1.76	-	0.39	0.51	-	-	-	80.14
	2,6	0.90**	2.29	-	0.35	-	-	-	0.53	81.11
	3,6	0.89**	2.97	-	-	0.37	-	-	0.49	79.96
	1,2,3	0.93**	0.50	0.56	0.12	0.27	-	-	-	85.91
	1,3,6	0.92**	0.80	0.55	-	0.15	-	-	0.24	86.42
	2,3,6	0.90**	1.74	-	0.29	0.25	-	-	0.35	21.99
	1,2,3,6	0.93**	0.59	0.52	0.08	0.13	-	-	0.22	86.56

* Significant at 5% ** Significant at 1%

DC Dependedn Character IC Independent character

1 Plant heigh 2 No. of leaves per plant 3 Flower diameter

4 Spike length 5 Rachis length 6 flowering duration

7 Number of spikes/plant 8 Number of florets/spike

characters with yield (number of spikes per plant and number of florets per spike). Some of the characters like plant height, spike length, flower diameter and flowering duration have a determination value of above 80 per cent. These characters contribute to a maximum extent for predicting the yield in terms of number of spikes to a greater extent. Although, all the characers are having high association with number of florets per spike (correlation value ranging from 0.79 to 0.91), the coefficient of determination of the characters *viz.*, plant height, flower diameter, spike length and duration of flowering have more than 80 per cent and these characters could be used for predicting the yield. Other characters have a determination value of more than 70 per cent.

Also, it is seen from Table 2 that characters taken in combination of two or three at a time had enhanced the association values compared with character taken individually, the 'r' values varied from 0.90 to 0.95 indicating there existed almost perfect relation of character with yield. The plant character such as plant height + flower diameter, plant height + flowering duration, plant height + flower diameter + number of leaves per plant, plant height + number of leaves + flower diameter and plant height + flower diameter + flowering duration determine the predictability to an extent of more than 85 per cent. Whereas other character could determine the predictability of less than 85 per cent.

Table 3 presents the association of two or more characters for predicting the yield in tuberose in terms of number of florets per spike. It is observed that the correlation values varied from 0.89 to 0.93 indicating that there was a good association of characters taken two or three together for predicting the yield. Plant height + flower diameter, plant height +flowering duration or plant height + number of leaves +flower diameter, plant height + flower diameter + flowering duration could predict the yield in terms of number of florets to an extent of more than 85 per cent.

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