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Path Coefficient Analysis for Yield Attributing Characters of Gladiolus

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ABSTRACT
An evaluation trial was laid out in randomized block design with three replications at HCRI, Venkataramannagudem, Andhra Pradesh and the material for the present study consisted eight hybrids namely (American Beauty, Arun, Darshan, Green Star, Limoncello, Meridiana, Pink Lady, White Prosperity and Dhiraj). An association between two traits is not a simple relationship but it is rather product of direct and indirect causes. A dependent character like number of spikes per plant was controlled by several component characters which were inter related in a complex manner. In the present study, the number of days taken for sprouting of corms along with number of days taken for spike initiation exhibited a high negative and direct effect on number of spikes per plant. But out of nineteen independent characters, fourteen characters are in favor of positive indirect effect of number of days taken for sprouting of corms on spike yield and only four traits contributed to negative indirect effect.
Key words: Gladiolus, Hybrids, Path, Analysis and Yield Attributes

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INTRODUCTION

Gladiolus is a bulbous ornamental plant belongs to family Iridaceae. The latin word 'Gladius' means sword and hence, it is often called as 'sword lily' because of the shape of its leaves. It is an elegant cut flower grown for its magnificent spikes. With changing life style and increased urban affluence, floriculture has assumed a definite commercial status in recent times and it has emerged as an important agribusiness venture. In this regard gladiolus has gained much importance as it is the 'Queen of bulbous flowers'. Venkataramannagudem falling in coastal region of Andhra Pradesh is a potential region with rich crop diversity. It is endowed with tropical climate and red loamy soils. Any attempt made to encourage cut flower production in the region not only helps the florists and consumers to get fresh and quality cut flowers regularly but also helps the small and marginal farmers in the region to improve their economic condition. Considering the increase in popularity of the gladiolus in the region the present study was carried to find out the extent of genetic variability in the crop by determining the path analysis for nineteen different quantitative traits.

MATERIAL AND METHODS

The present investigation entitled "Evaluation of gladiolus (*Gladiolus hybrida* L.) hybrids for growth, floral, corm parameters" was carried out during the period 2014-15 at Horticulture College and Research Institute, Dr. Y.S.R Horticultural University, Venkataramannagudem, Tadepalligudem mandal, West Godavari District. The experiment was laid out in randomized block design with three replications. The land was brought to a fine tilth by ploughing and harrowing. Plots were made with a gross plot size of 1.8 m x 1.5 m. The corms of gladiolus were taken and cleaned by removing the dry scales present on them. Later they were planted at a spacing of 30 cm x 20 cm in each row along the sides of ridges at a depth of 5-6 cm. The correlation coefficients only indicate the relationship of independent variable with the dependent variable without specifying cause and effect relationship. The concept of path coefficient analysis developed by Wright and illustrated by Dewey and Lu [3] was carried out separately to know the direct and indirect effects of the important components, which are the standardized partial regression.

The analysis was done for number of spikes per plant as dependent variable. The direct and indirect effects were classified based on the scale given by Lenka and Misra [6].

RESULT AND DISCUSSION

The data presented in table 1 indicated that the maximum values of direct effect on number of spikes per plant was registered by days taken for full spike emergence (2.34) and weight of corm and cormels per plant (1.38) followed by number of corms per plant (0.99). The other traits that exerted positive direct were rachis length (0.40), number of florets per spike (0.28), number of cormels per plant (0.19), floret diameter (0.12) and number of days taken for basal floret to fully open (0.08). The rest of the other characters exhibited negative direct effects on number of spikes per plant among them the highest negative effect was recorded by number of days taken for spike initiation (-1.92) followed by number of days taken for sprouting of corms (-1.37), spike length (-0.80), number of leaves per plant at maturity (-0.32), floret length (-0.29), leaf area per plant at maturity (-0.19), corm weight per plant (-0.16) and corm diameter (-0.07). Summarily, the path coefficient analysis has left a residual value of 0.21 indicating that all the estimated partial coefficient values explain 79 per cent of variation in the dependent variable *i.e.* number of spikes per plant. The trait number of days taken for full spike emergence has been found to influence the dependent variable number of spikes per plant indirectly through weight of corm and cormels per plant (0.23), floret length (0.19), rachis length (0.14), days taken for basal floret to fully open (0.09), number of cormels per plant (0.05), leaf area per plant at maturity (0.05), number of corms per plant (0.04), corm diameter (0.03), number of florets per spike (0.01) and plant height at maturity (0.01). The weight of corm and cormels per plant could influence the number of spikes per plant indirectly through days taken for full spike emergence (0.39), number of florets per spike (0.17), number of corms per plant (0.17), rachis length (0.16), number of cormels per plant (0.09), floret diameter (0.06) and vase life (0.02). Similarly highest the number of days taken for spike initiation (-1.92) could negatively influenced number of spikes per plant via number days taken for basal floret to show colour (-0.84), spike length (-0.19), number of leaves per plant (-0.13), number of corms per plant (-0.05), vase life (-0.02), floret length (-0.01) and number of florets per spike (-0.01).

Table 1.Genotypic path analysis (number of spikes per plant as dependent character) in gladiolus

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}	NS
X_1	**-1.37**	0.53	0.87	0.52	0.02	-0.08	-0.12	0.02	0.32	-0.01	-0.38	0.25	0.49	0.36	-1.12	-0.72	0.95	0.38	-0.59	**0.60**
X_2	0.01	**-0.04**	-0.02	-0.03	0.01	0.01	0.01	0.01	-0.03	-0.01	-0.02	-0.03	-0.03	-0.04	0.01	-0.02	-0.03	-0.02	-0.02	**0.12**
X_3	0.20	-0.18	**-0.32**	-0.30	-0.13	-0.10	-0.09	-0.12	-0.11	-0.05	0.09	-0.09	-0.26	-0.13	0.18	-0.01	-0.20	-0.27	-0.06	**-0.32**
X_4	0.07	-0.13	-0.18	**-0.19**	0.04	0.05	0.06	0.06	-0.08	-0.01	0.01	-0.15	-0.20	-0.14	0.06	-0.05	-0.15	-0.14	-0.07	**-0.14**
X_5	0.02	0.35	-0.78	0.47	**-1.92**	-1.92	-1.94	-1.99	-0.23	-0.59	0.11	1.24	0.16	0.93	0.09	0.01	0.87	-0.60	-0.31	**0.03**
X_6	0.13	-0.51	0.75	-0.71	2.33	**2.34**	2.37	2.41	0.31	0.82	0.02	-1.49	-0.34	-1.11	0.09	0.08	-1.16	0.70	0.39	**0.08**
X_7	-0.07	0.20	-0.25	0.29	-0.84	-0.85	**-0.84**	-0.85	-0.13	-0.33	-0.01	0.50	0.09	0.39	-0.01	-0.04	0.42	-0.23	-0.13	**0.04**

X_8	-0.01	-0.02	0.03	-0.03	0.09	0.09	0.09	**0.08**	0.01	0.03	-0.01	-0.05	-0.01	-0.04	-0.01	-0.01	-0.04	0.02	0.01	**-0.05**
X_9	0.18	-0.59	-0.27	-0.24	-0.19	-0.10	-0.12	-0.09	**-0.80**	0.35	0.22	-0.66	-0.68	-0.60	0.27	-0.52	-0.58	-0.64	-0.40	**0.05**
X_{10}	0.01	0.17	0.06	0.03	0.12	0.14	0.16	0.14	0.35	**0.40**	0.19	0.18	0.27	0.21	-0.04	0.25	0.13	0.24	0.16	**0.09**
X_{11}	0.08	0.16	-0.08	-0.01	-0.01	0.01	0.01	-0.02	0.19	0.16	**0.28**	0.15	0.01	0.18	0.08	0.21	0.07	0.07	0.17	**0.19**
X_{12}	0.05	-0.25	-0.08	-0.24	0.19	0.19	0.17	0.19	-0.24	-0.13	-0.16	**-0.29**	-0.22	-0.32	0.08	-0.19	-0.29	-0.19	-0.13	**-0.02**
X_{13}	-0.04	0.10	0.10	0.13	-0.01	-0.01	-0.01	-0.01	0.10	0.08	0.01	0.09	**0.12**	0.12	-0.08	0.07	0.12	0.11	0.06	**-0.54**
X_{14}	0.01	0.05	0.02	0.03	-0.02	-0.02	-0.02	-0.02	0.04	0.02	0.03	0.05	0.05	**0.05**	-0.01	0.03	0.04	0.03	0.02	**0.14**
X_{15}	0.81	-0.41	-0.55	-0.32	-0.05	0.04	0.02	-0.05	-0.33	-0.11	0.28	-0.27	-0.69	-0.23	**0.99**	0.22	-0.71	-0.26	0.17	**0.80**
X_{16}	-0.08	-0.08	-0.01	-0.04	0.01	-0.01	-0.01	0.01	-0.10	-0.10	-0.12	-0.10	-0.09	-0.09	-0.03	**-0.16**	-0.03	-0.08	-0.15	**0.51**
X_{17}	0.05	-0.06	-0.04	-0.06	0.03	0.03	0.03	0.03	-0.05	-0.02	-0.02	-0.07	-0.07	-0.07	0.05	-0.01	**-0.07**	-0.04	-0.01	**-0.37**
X_{18}	-0.05	0.11	0.16	0.14	0.06	0.05	0.05	0.05	0.15	0.11	0.05	0.12	0.17	0.11	-0.05	0.09	0.12	**0.19**	0.09	**-0.03**
X_{19}	0.60	0.75	0.28	0.50	0.22	0.23	0.22	0.09	0.70	0.55	0.83	0.63	0.69	0.57	0.24	1.28	0.17	0.71	**1.38**	**0.55**

Residual effect = 0.21

Bold: Direct effect — Above and below diagonal: Indirect effect

X_1: Days taken for sprouting of corm
X_2: Plant height at maturity
X_3: Number of leaves per plant at maturity
X_4: Leaf area per plant at maturity
X_5: Days taken for spike initiation
X_6: Days taken for full spike emergence
X_7: Days taken for basal floret to show colour
X_8: Days taken for basal floret to fully open
X_9: Spike length
X_{10}: Rachis length
X_{11}: Number of florets per spike
X_{12}: Floret length
X_{13}: Floret diameter
X_{14}: Vase life
X_{15}: Number of corms per plant
X_{16}: Corm weight per plant
X_{17}: Corm diameter
X_{18}: Number of cormels per plant
X_{19}: Weight of corm and cormel per plant
NS: Number of spikes per plant

An association between two traits is not a simple relationship but it is rather product of direct and indirect causes. Correlation coefficient measures only the extent of association between any two characters but fails to give a complete picture of the other characteristics involved in the complicated

path way leading to the end point. Therefore, significant correlation is no proof of direct or causal relationship the indirect association becomes more complex and perplexing as more and more variable are considered. Thus correlation coefficients together with path coefficient values will be more useful in finding out characteristics association. A dependent character like number of spikes per plant was controlled by several component characters which were inter related in a complex manner. In the present study, the number of days taken for sprouting of corms along with number of days taken for spike initiation exhibited a high negative and direct effect on number of spikes per plant. But out of nineteen independent characters, fourteen characters are in favor of positive indirect effect of number of days taken for sprouting of corms on spike yield and only four traits contributed to negative indirect effect. For each of the direct effects the partitional effects were sufficiently explained by the values of indirect effects. For example number of days taken for full spike emergence had the highest and positive direct effect on spike yield. This indicated that though a hybrid cultivar took least time for sprouting of corm and spike initiation, it should take a prolonged duration for full emergence of spike in order to have maximum diameter of floret and maximum number of florets per spike. Such a cultivar also will have better chances of producing the highest underground weight of corms and cormels per plant. Values of indirect effects associated with the direct effect of number of days taken for full spike emergence on spike yield per plant are in conformity with these facts. A similar opinion was also reported by Anuradha *et al.* [1], Anuradha and Gowda [2], Hossain *et al.* [3], Katwate *et al*. [5] and Rashmi [7] in gladiolus.

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REFERENCES

1. Anuradha, S., Narayana, G.J.V. and Jaya, P.K.V. (2002). Path-coefficient analysis in gladiolus. *J. of Ornamental Hort.*.5(1):32-34.
2. Anuradha, S. and Gowda, J.V.N. (2000). Path coefficient analysis in gladiolus. *Proceedings of the National Conference on Gladiolus*. pp92.
3. Dewey, D.R. and Lu, K.U. (1959). A correlation path coefficient analysis of component of crested wheat grass production. *Agronomy J.*.51:515-518.
4. Hossain, M.D., Bhuiyan, M.S.R., Talukder, K.H., Islam, M.R. and Syed, M.A. (2012). Study on vegetative materials, flower characteristics and production of true seed through crossing among the different gladiolus genotypes. *Advances in Biological Res.*6(2):52-58.
5. Katwate, S.M., Nimbalkar, C.A., Desai, U.T. and Warade, S.D. (2002). Variability analysis in gladiolus hybrids. *South Indian Horti.*50(4-6):629-634.
6. Lenka, D. and Mishra, B. (1973). Path coefficient analysis of yield in rice varieties. *Indian J. of Agri. Sci*.43:376-379.
7. Rashmi, L. (2006). Evaluation of promising hybrids of gladiolus. *M.Sc. (hort.) Thesis.* University of Agricultural Sciences. Dharwad.

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