CHARACTER ASSOCIATION AND PATH COEFFICIENT ANALYSIS IN CORIANDER *(CORIANDRUM SATIVUM* L.)

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Abstract: Correlation and path coefficient were studies among one hundred twenty accession of coriander (*Coriandrum sativum* L.) for 8 characters. The seed yield per plant showed highly significant positive correlation with plant height, branches per plant, umbels per plant, umbellets per umbel and seeds per umbel. Umbels per plant showed highest positive direct effect on seed yield per plant followed by plant height, seeds per umbel and 1000-seed weight. The studies suggested that selection for umbels per plant, plant height, seeds per umbel and 1000-seed weight is important to involve high yielding genotypes of coriander.

Keywords: Path coefficient, coriander, *Coriandrum sativum*

INTRODUCTION

Coriander (*Coriandrum sativum* L.) is one of most the important spices crop. Besides its nutrional value, it possesses medicinal properties. Seed yield is complex character as it is under polygenic control and is more responsive to varying environmental condition. An efficiency of selection in any breeding programme mainly depends on the knowledge of the role of environment and degree of association of component characters. The phenotypic correlation indicates the extent of the observed relationship between characters, while genotypic correlation provides an estimate of inherent association between genes controlling any two characters. However, path coefficient in to measure of direct and indirect affects. Such studies are equally significant in segregating, generations of any crop for direct/ indirect selection in view of this; attempts were made to study the interrelation of important characters in coriander.

MATERIAL AND METHOD

One hundred twenty accession of coriander (*Coriandrum sativum* L.) were randomly selected from a large collection of Germplasm maintained under "All India Coordinated Research Project on Spices" at S. K. N. College of Agriculture, Jobner. These accession along with namely Rcr-20,Rcr-41,Rcr-435,Rcr-436, Rcr-684 and local check were evaluated during Rabi-2001-2002 at research from S. K. N. college of Agriculture , Jobner in an Augmented Randomized Complete Block Design (Federer 1956). This design was in this crop because of two reasons, first the number lines to be evaluated of error, which is used for deriving adjusted values of accession. The field was divided in 5 block. Accession and check varieties were sown in a plot size of 4.0 to 6.0 M accommodating two rows four meter long spaced 30 cm apart with plant to plant distance of 10 cm maintaining by thinning at 27th days after sowing. Recommended package of practices were followed to raise a good crop. The observations were recorded on different morphological characters i. e. days to 50% flowering, plant height, branches per plant, umbels per plant, umbellets per umbel, seeds per umbel, 1000-seed weight and seed yield per plant. The date was recorded on ten randomly selected plants basis except for days to 50% flowering. The genotypic and phenotypic coefficient was estimated by applying the formula suggested by Robbinson *et.al*. (1951). The coefficient analysis was carried out according to the method given by Dewey and Lu (1956).

RESULT AND DISCUSSION

The knowledge of association between seed yield and its components is essential for swifting a component traits vis-à-vis seed yield. The correlation among seed yield and other traits are given in table-1. The phenotypic correlations were slightly higher in direction and magnitude than genotypic correlation suggesting a strong inherent association between characters which were truly reflected in phenotypic expression. The results were in agreement with the observations of Sharma and Sharma (1989). The seed yield per plant was positively and significantly correlated with plant height, branches per plant, umbels per plant, umbellets per plant and seeds per umbel. Positive and significant association of seed yield per plant were reported by several workers like with plant height by Tripathi et.al.(2000); with branches per plant, umbels per plant, umbellets per umbel by Sharma (1992). Among the various inter relationship between remaining traits, plant height showing positive and significant correlation with

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branches per plant, umbel per plant, umbellets per umbel and seeds per umbel. Branches per plant had high positive and significant correlation only with umbels per plant. Umbellets per umbel had positive and significant correlation with seeds per umbel. Similar result have been reported by Sharma and Sharma (1989).

Coefficient of correlation measures the association between the characters, however, these may not give a true picture under complex situation and under such condition, path coefficient analysis provides a means of measuring the direct as well as indirect affect via other traits of one trait on the end product i. e. seed yield. Estimates of direct and indirect effects of individual character towards seed yield per plant are presented in table -2. Out of eight casual factors studied in path coefficient analysis, only five characters namely umbels per plant, plant height, seeds per umbel, 1000-seed weight and branches per plant. Showed maximum positive direct as well as indirect contribution through other characters on seed yield. This confirmed valuable role of above characters determining the seed yield, hence their importance constructing selection criteria. Srivastava *et.al.* (2000) reported similar finding in coriander. The seed yield 1000-seed weight had high positive direct effect but its correlation with seed yield was negative as compared to umbel per plant due to considerable high negative indirect effect.

Therefore, umsbels per plant are prime important component character of seed yield per plant. It is also positively associated with all other characters except 1000-seed weight and days to 50% flowering and it has high direct and indirect effect on seed yield per plant. This character should be given due attention in making selection for seed yield. However, it should borne in mind that this character is influenced by environment. Plant height, seeds per umbe land 1000-seed weight were other traits which could account in a selection programme because of their appreciable direct and indirect effects. So selection can be accomplished to evolve high yielding varieties in coriander.

Table 1: Correlation coefficient on the basis of unadjusted values (phenotypic level) and on the basis of adjusted value (genotypic level) between different characters of coriander.

Characters		Plant height	Branches per plant	Umbels per plant	Umbellets per umbel	Seeds per umbel	1000-seed weight	Seed yield per plant (g)
Days to 50% flowering	**P**	0.2179*	0.0813	0.0398	0.0946	0.4511**	0.1493	0.1651
	G	0.2004	0.0115	0.0157	.01080	0.4477	0.1600	0.1889
Plant height	**P**		0.3527**	0.3445**	0.3144**	0.4675**	0.2836**	0.5414**
	G		0.2880	0.3374	0.3028	0.4562	0.2617	0.5079
Branches per Plant	**P**			0.6768**	0.1451	0.0423	0.0075	0.5064**
	G			0.6526	0.1551	0.0459	0.0445	0.4888
Umbels per plant	**P**				0.1547	0.1076	0.0523	0.5556**
	G				0.1523	0.1473	0.0920	05720
Umbellets per umbel	**P**					0.4741**	0.3918**	0.2790**
	G					0.4643	0.3715	0.2892
Seeds per umbel	**P**						0.4736**	0.3843**
	G						0.4740	0.1473
1000- seed weight	**P**							0.0108
	G							0.0546

*Significant at (P = 0.05) ** Significant at (P = 0.01)

Table 2: Direct (Diagonal) and indirect effects of different characters on seed yield per plant in coriander at phenotypic and genotypic levels

Characters		Days to 50% flowering	Plant height	Branches per plant	Umbels per plant	Umbellets per umbel	Seeds per umbel	1000 seed weight	Correlation with seed yield per plant
Days to 50% flowering	**P**	**0.0356**	0.0612	0.0137	0.0127	0.0077	0.1247	0.0377	0.1665
	G	**0.0405**	0.0455	0.0022	0.0053	0.0084	0.1381	0.0362	0.1889
Plant height	**P**	0.0078	**0.2807**	0.0593	0.1104	0.0255	0.1292	0.0716	0.5414**
	G	0.0081	0.2269	0.0541	0.1137	0.0236	0.1408	0.0592	0.5079
Branches per plant	**P**	0.0029	0.0990	**0.1681**	0.2168	0.0118	0.0117	0.0019	0.5064**
	G	0.0005	0.0653	0.1878	0.2200	0.0121	0.0142	0.0101	0.4888
Umbels per plant	**P**	0.0014	0.0967	0.1138	**0.3204**	0.0126	0.0297	0.0132	0.5586**
	G	0.0006	0.0765	0.1225	0.3371	0.0118	0.0454	0.0208	0.5720
Umbellets per umbel	**P**	0.0034	0.0883	0.0244	0.0496	0.0812	0.1311	0.0989	0.2790**
	G	0.0040	0.0687	0.0291	0.0513	0.0778	0.1433	0.0854	0.2892
Seeds per umbel	**P**	0.0356	0.1312	0.0071	0.0345	0.0385	**0.2765**	0.0095	0.3843**
	G	0.0181	0.1035	0.0086	0.0496	0.0367	0.3085	0.1073	0.4173
1000 seed weight	**P**	0.0053	0.0796	0.0013	0.0167	0.0318	0.1309	**0.2523**	0.0108
	G	0.0065	0.0594	0.0083	0.0310	0.0294	0.1463	0.2263	0.0546

Genotypic residual effect =0.4536 **Phenotypic residual effect** = 0.4519

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