

**CORRELATION COEFFICIENTS OF COMPONENT CHARACTERS WITH
SEED YIELD AND THEIR DIRECT EFFECTS IN PATH ANALYSIS IN
CORIANDER GROWN UNDER THREE ENVIRONMENTS**

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ABSTRACT

Thirty diverse genotypes of coriander were grown in three different environments (D_1 to D_3) created by sowing dates during rabi 2011-12 at Vegetable Research Station, Junagadh. Seed yield per plant was positively and significantly correlated with harvest index and 100-seed weight at both genotypic and phenotypic level in all the three dates of sowing, whereas, seed yield per plant had significant and positive correlation with umbellets per plant in D_2 at both genotypic and phenotypic level and in D_1 at phenotypic and in D_3 at genotypic level. In addition to that, in timely sowing condition (D_2), seed yield per plant showed significant and positive correlation with longest basal leaf length and number of basal leaves at genotypic level and with number of fruit bearing branches at phenotypic level. In late sowing condition (D_3), seed yield per plant showed significant and positive correlation with number of fruit bearing branches and umbels per plant at genotypic level. This indicated that importance of these traits as compliment of seed yield. Path coefficient analysis revealed that the days to 50 per cent flowering, 100-seed weight, plant height, number of basal leaves, longest basal leaf length, umbels per plant and umbellets per plant in early sown condition (D_1); harvest index, days to 50 per cent flowering, longest basal leaf length, umbels per plant, umbellets per plant, seeds per umbel and 100-seed weight in timely sown condition (D_2); and days to 50 per cent flowering, plant height, number of basal leaves, number of fruit bearing branches and umbellets per plant in late sown condition (D_3) exhibited high and positive direct effects on seed yield per plant.

KEY WORDS: *Coriander, correlation, path analysis, environme*

INTRODUCTION

Coriander (*Coriandrum sativum* L.) is an important seed spice crop belonging to the family Apiaceae (previously classified under the family Umbelliferae) with a diploid chromosome number $2n=22$. Improvement in seed yield could be achieved through selection of

component characters influencing yield. An understanding of the character association of component traits with yield and their direct effects in path analysis is important for effective selection of traits for high yield. But the estimates of correlation coefficients and path coefficients are subjected to change by the

environments in which the crop is grown. Therefore, this present investigation was undertaken to study the genotypic and phenotypic correlation co-efficient of component characters with seed yield and their direct effects in path analysis in a population of 30 diverse genotypes of coriander grown under three environments created by date of sowing. Such studies will help in identifying component characters influencing seed yield of coriander which are less sensitive to environmental changes.

MATERIALS AND METHODS

Thirty diverse genotypes of coriander were grown in three different environments (D₁ to D₃) created by sowing dates [21-10-2011 (D₁ - early sown), 15-11-2011 (D₂ - timely sown) and 10-12-2011 (D₃ - late sown)] during rabi 2011-12 in randomized block design at Vegetable Research Station, Junagadh. Geographically Junagadh is situated at 21.5° N latitude and 70°E longitude with an altitude of 60 meters above the mean sea level. The soil of experimental site was medium black, alluvial in origin and poor in organic matter. The climate of the area represents tropical condition with semiarid nature. Observations on five randomly selected plants per genotype per replication in each environment were recorded for days to 50 per cent flowering, plant height, number of basal leaves, longest basal leaf length, number of fruit bearing branches, umbels per plant, umbellets per plant, seeds per umbel, seed yield per plant, 100-seed weight, days to maturity and harvest index. Data were analyzing for phenotypic and genotypic correlation coefficients (Al-Jibouri *et al.*, 1958) and path analysis (Dewey and Lu, 1959).

RESULT AND DISCUSSION

The genotypic and phenotypic correlation co-efficient of component characters with seed yield were estimated (Table 1) to study how seed yield was influenced by its component characters in all the environments. Seed yield per plant was positively and significantly correlated with harvest index and 100-seed weight at both genotypic and phenotypic level in all the three dates of sowing, whereas, seed yield per plant had significant and positive correlation with umbellets per plant in D₂ at both genotypic and phenotypic level and in D₁ at phenotypic and in D₃ at genotypic level. In addition to that, in timely sowing condition (D₂), seed yield per plant showed significant and positive correlation with longest basal leaf length and number of basal leaves at genotypic level and with number of fruit bearing branches at phenotypic level. In late sowing condition (D₃), seed yield per plant showed significant and positive correlation with number of fruit bearing branches and umbels per plant at genotypic level. This indicated that importance of these traits as compliment of seed yield. The results also revealed that genotypic correlation of a character with seed yield in an environment resembled closely its phenotypic correlation. Similar results were reported by Rao *et al.* (1981), Peter *et al.* (1985), Bhandari and Gupta (1991), Ali *et al.* (1993), Mandal and Hazra (1993), Singh *et al.* (2006) and Meena *et al.* (2010).

The path coefficient analysis revealed that the days to 50 per cent flowering, 100-seed weight, plant height, number of basal leaves, longest basal leaf length, umbels per plant and umbellets per plant in early sown condition (D₁); harvest index, days to 50 per cent flowering, longest basal

leaf length, umbels per plant, umbellets per plant, seeds per umbel and 100-seed weight in timely sown condition (D₂); and days to 50 per cent flowering, plant height, number of basal leaves, number of fruit bearing branches and umbellets per plant in late sown condition (D₃) exhibited high and positive direct effects on seed yield per plant. Thus, these characters turned-out to be the major components of seed yield and direct selection for these traits would be rewarding for yield improvement. Similar results were reported by Joshi *et al.* (1972), Rao *et al.* (1981), Sharma and Sharma (1989), Vedamuthu *et al.* (1989), Sanker and Khader (1991), Bhandari and Gupta (1991), Mandal and Hazra (1993), Kumar (1997), Singh *et al.* (2006) and Meena *et al.* (2010). The residual effect was of low magnitude, suggesting that the more yield attributes have been included in the path analysis.

CONCLUSION

From the present investigation, it can be concluded that more emphasis should be given to harvest index, 100-seed weight, umbellets per plant, longest basal leaf length, number of basal leaves, number of fruit bearing branches and umbels per plant for the improvement in seed yield in coriander.

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Table 1: Genotypic (G) and phenotypic (P) correlation co-efficient of eleven component characters with seed yield in three different environments.

Characters		D ₁	D ₂	D ₃
Days to 50 per cent flowering	G	0.074	-0.190	-0.256*
	P	-0.001	-0.049	-0.190
Plant height (cm)	G	0.320	-0.216	0.144
	P	-0.006	0.011	0.070
Number of basal leaves	G	0.271	0.447**	-0.090
	P	0.119	0.041	-0.010
Longest basal leaf length (cm)	G	-0.800**	0.757**	0.453**
	P	-0.108	0.139	0.070
Number of fruit bearing branches	G	0.067	0.340**	0.209
	P	0.109	0.250**	0.110
Umbels per plant	G	0.125	-0.053	0.272*
	P	0.062	0.170	0.110
Umbellets per plant	G	0.123	0.381**	0.370**
	P	0.286*	0.294*	0.160
Seeds per umbel	G	-0.085	0.483**	0.224
	P	0.123	0.230	0.080
100-seed weight (g)	G	0.965**	1.000**	0.810**
	P	0.908**	0.516**	0.600**
Days to maturity	G	-0.013	-0.204	-0.199
	P	0.001	0.621**	-0.130
Harvest index (%)	G	1.000**	0.890**	0.895**
	P	0.394**	0.621**	0.810**

*, ** Significant at 5 per cent and 1 per cent levels of significance, respectively.

Where,

D₁- First date of sowing (Early)

D₂- Second date of sowing (Timely)

D₃- Third date of sowing (Late)

Table 2: Direct effects of eleven characters on seed yield in three different environments

Characters	D ₁	D ₂	D ₃
Days to 50 per cent flowering	1.632	0.055	0.528
Plant height (cm)	0.681	-0.309	0.336
Number of basal leaves	0.494	-0.238	0.344
Longest basal leaf length (cm)	0.376	0.213	-0.385
Number of fruit bearing branches	-0.147	-0.144	0.122
Umbels per plant	0.291	0.184	-0.093
Umbellets per plant	0.083	0.259	0.286
Seeds per umbel	-0.383	0.523	-0.386
100-seed weight (g)	1.022	0.362	-0.950
Days to maturity	-1.325	-0.239	-0.347
Harvest index (%)	-0.034	0.591	1.897
Residual Effect	0.412	0.610	0.524

Where,

D₁- First date of sowing (Early)

D₂- Second date of sowing (Timely)

D₃- Third date of sowing (Late)