Correlation and path co-efficient analysis in cauliflower (*Brassica oleracea* var. botrytis L.)

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Abstract : Correlation and path coefficient analysis were conducted on 'Pushi' variety of Cauliflower. Yield was found to be highly and significantly positively correlated with all the ancillary characters *viz.,* curd weight (0.9941), number of the leaves (0.9674), leaf area (0.9661), curd diameter (0.9412), plant spread (0.9161), plant height (0.8239) and curd depth (0.8068). All the ancillary characters showed significantly positive correlations among themselves. The path coefficient analysis values also indicated that the maximum positive direct effect accrued due to leaf count followed by curd weight, plant height and curd depth. Whereas plant spread, leaf area and curd diameter showed direct negative effect. The value of residual effect was found to be 0.0801, indicating that the characters included for path analysis were sufficient for inducing the maximum yield of cauliflower.

Key Words : Correlation co-efficient, Path co-efficient, Cauliflower, Yield

INTRODUCTION

Yield in plant is the end product of interaction of various correlated characters. Therefore, knowledge of interrelationship of characters may prove highly useful in an objective selection of desired characters. It is not only polygenetically controlled but also subject to the fluctuating environment. When a number of variables are considered in correlation, the association becomes more complex and less obvious. The use of path coefficient analysis is helpful under such situation. This analysis while shows the direct and indirect association reveals the most reliable yield contributing characters. A wide range of variability is available, which provides a great scope for improving yield of cauliflower through a systematic and planned selection programme for one or more direct or indirect yield components. Keeping in view the above facts, the present investigation was conducted to determine the nature and degree of association among the characters and their direct and indirect effects on curd yield of cauliflower.

MATERIAL AND METHODS

Under the aegis of ICAR'S Adhoc Project, present experiment was conducted under Birsa Agricultural University, Kanke, Ranchi in the experimental area of the department during the year 2002-03 and 2003-04 to study the correlation and path coefficient analysis in cauliflower utilizing promising variety "Pushi". The seeds were sown in the third week of August in both the years (2002 and 2003) and seedlings were transplanted at a spacing of 60 cm x 30 cm. in last week of September in a Factorial Randomized Block Design with three replications. The plot size was 3m x 3m and number of plants/ plot was 50. All the cultural operations were done in time and timely plant protection measures were also adopted. The harvesting had been commenced from the 1st week of January and continued till the last week of January in both the years of experimentation. The observation on curd yield and other ancillary characters were recorded. The pooled data were statistically analysed to determine the correlation co-efficient and path

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Table 1 : Correlation co-efficients between different pairs of characters in cauliflower

Characters	Plant spread (x_2)	Number of leaves (x_3)	Leaf area (x_4)	Weight of the curd (x_5)	Diameter of the curd (x_6)	Depth of the curd (x_7)	Yield q/ha (y)
Plant height cm. (x_1)	0.8852**	0.8604**	0.8638**	0.8271**	0.9080**	0.6122**	0.8239**
Plant spread cm. (x_2)		0.9620**	0.9636**	0.9168**	0.9487**	0.7941**	0.9161**
Number of leaves (x_3)			0.9998**	0.9592**	0.9474**	0.8606**	0.9674**
Leaf area cm. (x_4)				0.9588**	0.9464**	0.8632**	0.9661**
Weight of the curd g. (x_5)					0.9386**	0.8011**	0.9941**
Diameter of the curd cm. (x_6)						0.6664**	0.9412**
Depth of the curd cm. (x_7)							0.8068**

* and ** indicate significance of values at P=0.05 and 0.01, respectively

Table 2 : Direct and indirect effects of different characters in cauliflower

Characters	Plant spread (x_2)	Number of leaves (x_3)	Leaf area (x_4)	Weight of the curd (x_5)	Diameter of the curd (x_6)	Depth of the curd (x_7)	Yield Q/ha. (y)
Plant height cm. (x_1)	-0.0633	2.7453	-2.5510	0.6753	-0.0099	0.0033	0.8239
Plant spread cm. (x_2)	**-0.0715**	3.0695	-2.8458	0.7486	-0.0103	0.0043	0.9161
Number of leaves (x_3)		**3.1907**	-2.9528	0.7832	-0.0103	0.0047	0.9674
Leaf area cm. (x_4)			**-2.9532**	0.7828	-0.0103	0.0047	0.9661
Weight of the curd g. (x_5)				**0.8165**	-0.0102	0.0044	0.9941
Diameter of the curd cm. (x_6)					**-0.0109**	0.0036	0.9412
Depth of the curd cm. (x_7)						**0.0054**	**0.8071**

Bold figures are direct effect,   Residual effect: 0.0801, R^2 = 0.9937 or 99.37%.

coefficients as per method suggested by Al-Jibouri *et al.* (1958) and Dewey and Lu (1959), respectively.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

The relationship between the yield of cauliflower and ancillary characters:

Besides, the yield, other variables *viz.,* plant height (x_1), plant spread (x_2), number of leaves (x_3), leaf area (x_4), weight of the curd (x_5), diameter of the curd (x_6) and depth of the curd (x_7), which were thought to influence the yield, were also primarily considered. Total correlation coefficients between the yield and other characters were calculated and the values so obtained are summarised in Table 1.

The pooled data clearly depicted that the yield was significantly and positively correlated with all the other characters with the maximum of 0.9941 (weight of the curd) followed by 0.9674 (number of leaves) and 0.9661 (leaf area). However, the minimum value observed was 0.8068 with depth of the curd (x_7). These findings are in conformity with those of Jamwal *et al.* (1992), Dutta and Korla (1991), Kumar and Korla (2001) and Sharma *et al.* (2006) in cauliflower. Others characters recorded intermediate values in this respect.

All other characters have also recorded highly significant inter association among themselves *i.e.*, an increase in any of these characters, led to a corresponding increase in the curd yield.

The yield and yield attributes were highly and significantly associated amongst themselves.

The analysis of path co-efficients (Table 2) indicated that the maximum positive direct effect was found due to number of leaves followed by weight of the curd, plant height and depth of the curd, whose correlations with yield were also positive. Whereas, plant spread, leaf area and diameter of the curd showed negative direct effect. Whole correlations were found positive indicating that plant spread, leaf area and weight of the curd via number of the leaves exhibited positive association with curd yield. The value of residual effect was found to be 0.0801, indicating that the characters included for path analysis were sufficient for maximizing the cauliflower yield.

Thus, it may be inferred that number of the leaves and weight of the curd may be adjudged to be the best characters for the production of higher yield of cauliflower.

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