



Correlation and Multiple Regression Studies of Yield and Yield Contributing Characters in Cauliflower (*Brassica oleracea* var. *Botrytis* L.)

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The study on Cauliflower cv. 'Pusa Dipali' was carried out to find out the correlation and multiple regression coefficients studies of yield and yield contributing characters. Yield was found to be highly and significantly positively correlated with all the ancillary characters viz, curd depth (0.9180), curd diameter (0.9050), weight of curd (0.8990), plant height (0.8898), weight of plant (0.8768) and plant girth (0.6880). The multiple regression coefficients were found to be non significant due to multi collinearity between the characters. The step wise regression analysis showed that curd depth has highest contribution towards field followed by curd weight, curd diameter and plant height while the lowest contribution was due to plant girth and weight of plant.

Keywords: Correlation; regression coefficients; cauliflower.

1. INTRODUCTION

Cauliflower is an important cole crop with respect to area and production in the world. India ranks

first, sharing 4.6% area, 5.3% production and 19.8 MT/ha productivity as reported by NHB (2013-2014). It is a cool season crop with stand temperature as minimum as 4⁰C and as high as

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38°C. The optimum temperature during September-October is 20°C to 25°C in the month of September-October and 5°C- 10°C during December-January (Kumar et al.) (2011) Cauliflower is available in the market for longer period. It can be grouped into major four groups on the basis of sowing time, early sowing (May-June) , mid-early (July – August), mid-late (October – November) and late (November – December). First three groups are tropical and the last group is temperate. For improvement of socio-economic status of the farmer, good variety and high quality seeds are essential, because all the inputs revolved around the seeds. Yield is govern by several attributes. The better knowledge of correlation among these traits and between the traits are essential for getting higher yield. The present investigation was carried out to study the correlation and multiple regression studies of yield and yield attributing characters in cauliflower. Knowledge of associations between traits is of great importance for planning breeding programme. Correlation and multiple regression between different important traits analysis help to breeder to determine suitable presser to improve yield. Visualizing all the facts under consideration, the present investigation was under taken to determine the yield traits in cauliflower through and multiple regression. The R² value shows the coefficient to determination or the prediction power of the equation.

2. MATERIALS AND METHODS

The present investigation was conducted at Birs Agricultural University, Kanke, Ranchi in the experimental area of the department of horticulture during the 2003-2004 and 2004-2005 to study to correlation and multiple regression coefficients are studies of yield and yield attributing character in cauliflower. The variety used in experiment was “Pusa Dipali”. The seeds were sown in the third week of August in both the

years (2003 and 2004). The seedlings was ready in 30 days and transplanted in the month of last week of September, The experiment was laid out in a randomized block design (factorial) replicated thrice. The size of the experimental plot was 3 m X 3 m and seedlings was transplanted at the spacing of 60cmX30 cm and each plot number of plants were 50. All the recommended cultural practices were followed in time and plant protection measures were taken as and when required during the experiment period. The observations were taken for plant height plant, plant girth, Plant weight, curd Weight, Curd diameter, Curd depth and yield and the pooled data were subjected to statistical analysis to determine the correlation and multiple regression coefficients as per method suggested by Al-Jobouri et al. [1] and Dewey and Lu [2].

3. RESULTS AND DISCUSSION

A perusal of data (Table 1 Fig. 1) revealed that yield had significant positive correlation with curd depth (0.9180), curd diameter (0.9050), curd weight (0.8990), plant height (0.8888) and plant weight (0.8768). Plant girth showed lowest positive correlation with yield (0.6880). These findings are in enclosed conformity with the result of many researchers [3,4,5,6] in cauliflower.

Inter correlation studies indicated that plant height had significant positive correlation with plant girth (0.7550), weight of plant (0.9320), curd weight (0.9432, curd diameter (0.9020) and curd depth (0.9260). Plant girth was positively correlated with weight of plant (0.7390), curd weight (0.7280), curd diameter (0.6670) and curd depth (0.7136), weight of plant also exhibited positive correlation with curd weight (0.9200), curd diameter (0.9390) and curd depth (0.9240). Curd diameter positively correlated with curd depth (0.9450). Similar results were also obtained by many researchers [7,8,9,10,11,12].

Table 1. Inter correlation coefficients among yield and yield attributing characters [13]

Characters	Plant height (cm) (X ₁)	Plant girth (cm) (X ₂)	Weight of plant (gm) (X ₃)	Curd weight (gm) (X ₄)	Curd diameter (cm) (X ₅)	Curd depth (cm) (X ₆)	Yield (q/ha) (Y)
Plant Height (cm) (X ₁)	1.0000	0.7554	0.9370	0.9422	0.9028	0.9269	0.8897
Plant Girth (cm) (X ₂)		1.0000	0.7398	0.7285	0.6671	0.7136	0.6881
Weight of Plant (gm) (X ₃)			1.0000	0.9205	0.9385	0.9095	0.8738
Curd weight (gm) (X ₄)				1.0000	0.9399	0.9246	0.8991
Curd Diameter (cm) (X ₅)					1.0000	0.9457	0.9053
Curd Depth (cm) (X ₆)						1.0000	0.9183

** Significant at 1% level

* Significant at 5% level

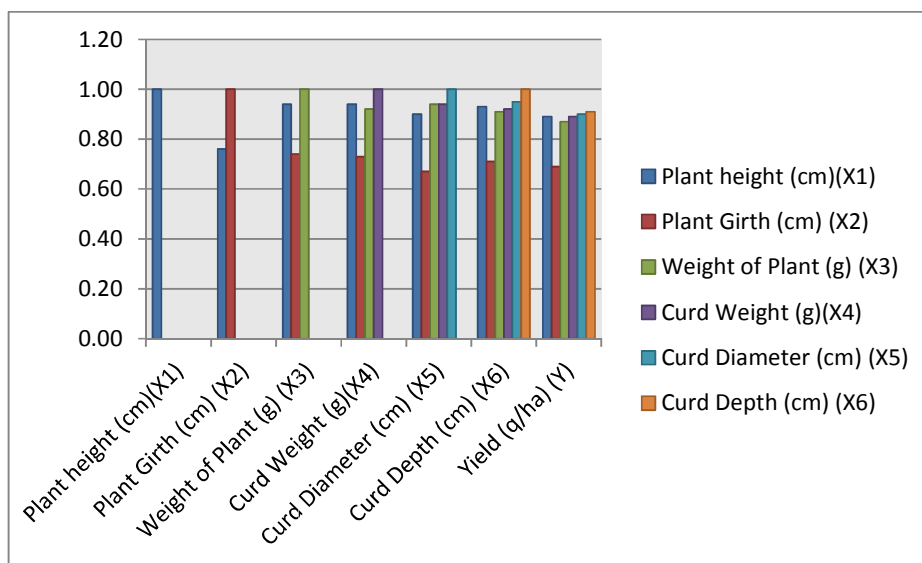


Fig. 1. Inter correlation coefficients among yield and yield attributing characters

Table 2. Multiple regression analysis [13]

Characters	Coefficient (b ₂)	S.E.	t	% contribution of X's towards yield
Intercept	- 301.1427	192.3819	- 1.225	
Plant Height (cm) (X ₁)	2.1285	4.4532	0.326	0.12
Plant Girth (cm) (X ₂)	6.9805	28.8920	0.206	0.02
Weight of Plant (gm) (X ₃)	-0.0214	0.1132	-0.0203	0.03
Curd weight (gm) (X ₄)	0.1055	0.2299	0.427	1.43
Curd Diameter (cm) (X ₅)	13.2840	19.1532	0.616	0.23
Curd Depth (cm) (X ₆)	24.3832	18.3934	1.315	83.95

$R = 0.9286, R^2 = 0.8539, Adj. R^2 = 0.8118, S.E. = 26.9614$

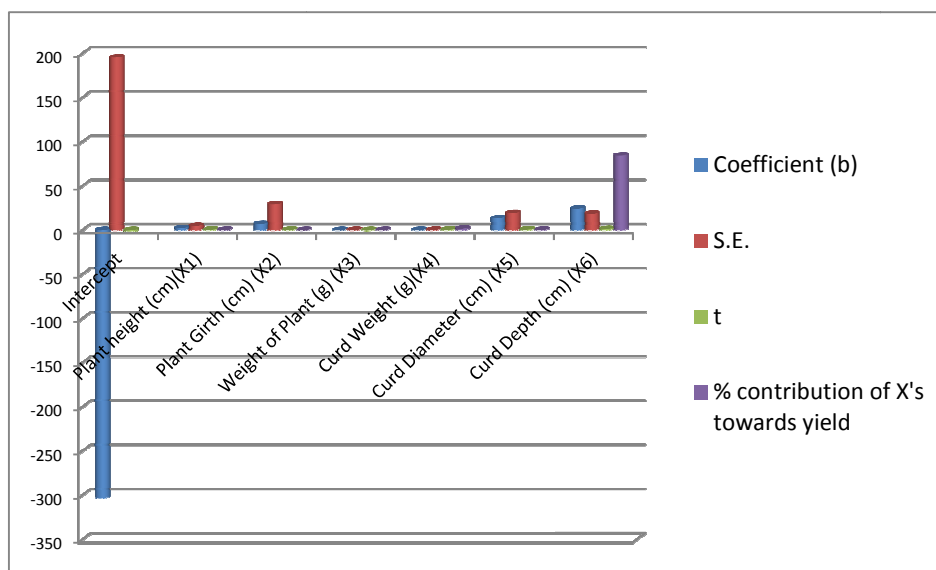


Fig. 2. Multiple regression analysis
 $R=0.93, R^2=0.87, Adj. R^2=0.82, S.E.=27.26$

The multiple regression coefficients (Table 2 Fig. 2) among yield and yield attributing characters was found to be

$$y = 301.15 + 2.13x_1 + 6.98x_2 - 0.02x_3 + 0.11x_4 + 13.28x_5 + 24.38x_6$$

The multiple regression coefficients were found to be non significant due to multi collinearity between the characters. The stepwise multiple regression analysis showed that curd depth (X_6) has highest contribution (X_5) and plant height (X_1) where as the lowest contribution was due to plant girth and weight of plant. It was also found that the independent variables included in multiple regression analysis explained 86.53 per cent variability in yield because the value of R^2 was 0.8653. The rest of the unexplained variability might be due to other variables not included in the analysis. These results are in conformity with several findings [14-18,19,13].

4. CONCLUSION

On the basis of results and discussion, it can be concluded that multiple coefficients were not found significant due to multi-collinearity between the characters. The curd depth has highest step wise regression while the lowest contribution was made by plant girth and weight of plant.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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