

PATH ANALYSIS FOR YIELD AND ITS COMPONENTS IN BREAD WHEAT (*T. aestivum* L.)

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A B S T R A C T

*The present experiment was carried out to study path analysis studies in wheat (*T. aestivum*) germplasm consists of a 510 set of accessions derived from NBPGR, New Delhi. Path analysis revealed that for obtaining higher grain yield in wheat due emphasis should be given for grain width per spike, 1000 grains weight and grain weight per spike, as these characters are positively correlated with grain yield, also had high positive direct and indirect influence on grain yield.*

KEY WORDS: Core collection, path analysis, wheat

INTRODUCTION

Wheat (*T. aestivum*) is one of the world's important cereal crop that excels all other cereal crops both in area and production, thereby providing about 20.0 per cent of total food calories for the people of the world. The selection of parents becomes more difficult if the improvement is made for polygenetically controlled complex traits like grain yield. Correlation studies along with path analysis provide a better understanding of the association of different characters with grain yield. Path coefficient (or) standardized partial regression coefficient that measures the direct effect of a predictor variable upon its response variable and the second component being the indirect effect(s) of a predictor variable (Dewey and Lu, 1959).

MATERIALS AND METHODS

Experiment was undertaken at the Centre of Excellent for Research on wheat, Sardar Krushinagar Dantiwada Agricultural University, Vijapur during Rabi 2012-13 in augmented block design (Federer, 1956) with 510 core collections derived from NBPGR, New Delhi with four block having 120 accessions and one block with 30 accessions with four common checks (Raj 3765, PBW 343, DBW 17 and C 306) in all the blocks. Evaluation was carried out single replication and the plant spacing kept within a row was 15 cm and row to row was 45 cm. Recommended package of practices were followed to raise the good crop. The data were recorded on five competitive plants on different morphological and agronomical traits like days to 50 per

cent spike emergence (days), days to maturity (days), plant height (cm), grain width per spike (cm), number of spikelet's per spike, spike length (cm), grain weight per spike, 1000 grain weight (g) and grain yield per plant. The direct and indirect effects at genotypic level for phenotypes were estimated by taking grain yield per plant as dependent variable using path analysis as suggested by Dewey and Lu (1959).

RESULTS AND DISCUSSION

Path coefficient analysis is an effective tool to analyse the direct and indirect influence of different characters on grain yield. This helps in giving due weightage to a particular character during selection. The path analysis (Table 1) revealed that the traits 1000 grain weight showed the highest direct positive effect (0.3600) on grain yield per plant followed by grain width per spike (0.3000), grain weight per spike (0.2050), days to maturity (0.1760) and spike length (0.0640). The results are akin to those of Monpara and Kalariya (2009). The character days to 50 per cent spike emergence had high and negative direct effect on grain yield, which suggests that the selection for early maturing lines with high yield is possible. These results are in line with Mondal *et al.* (1997).

The characters grain width per spike followed by 1000 grain weight and grain weight per spike exhibited significant correlation with grain yield per plant. Similarly, days to 50 per cent spike emergence (-0.306) also manifested significant correlation with grain yield per plant, but it was negative. Similar findings were reported by Kashif and Khaliq (2004). The stronger or weaker association of grain yield with component traits is grain width per spike, days to 50 per cent spike emergence, grain weight per spike, 1000 grains weight and days to maturity showed higher direct positive effects and indirect effects via other

components traits. These indicated that direct selection for these characters will enhance the breeding efficiency for grain yield in wheat. Hence, for a plant breeder engaged in the improvement of wheat yield, it would be necessary to lay the maximum emphasis on above mentioned characters. The residual effect (0.3615) indicated that the characters studied contributed 64% of the yield. It is suggested that maximum emphasis should be given to other characters which have not been considered needs to include accounting fully improvement in grain yield.

CONCLUSION

The present study revealed that for obtaining higher grain yield in wheat due emphasis should be given for grain width per spike, 1000 grains weight and grain weight per spike, as these characters are positively correlated with grain yield, also had high positive direct and indirect influence on grain yield.

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Table 1: Direct (diagonal) and indirect effects of different characters on grain yield in wheat.

Sr. No	Characters	Days to 50% Spike Emergence	Days to Maturity	Plant Height (cm)	Grain Width Per Spike (cm)	Number of Spikelets Per Spike	Spike Length (cm)	Grain Weight Per Spike (g)	1000 Grain Weight (g)	Correlation With Grain Yield Per Plant
1	Days to 50% Spike Emergence	-0.2940	0.1479	0.0051	-0.0716	-0.0119	0.0126	-0.0177	-0.0763	-0.306**
2	Days to Maturity	-0.2465	0.1760	0.0045	-0.0066	-0.0129	0.0113	0.0034	-0.0038	-0.074
3	Plant Height (cm)	-0.1232	0.0661	0.0120	-0.0088	-0.0087	0.0153	0.0018	-0.0097	-0.055
4	Grain Width Per Spike (cm)	0.0701	-0.0039	-0.0003	0.3000	-0.0046	0.0056	0.1230	0.2800	0.770**
5	Number of Spikelets Per Spike	-0.0867	0.0568	0.0026	0.0343	-0.0400	0.0336	0.0543	-0.0213	0.033
6	Spike Length (cm)	-0.0561	0.0312	0.0029	0.0265	-0.0212	0.0640	0.0402	-0.0150	0.072
7	Grain Weight Per Spike (g)	0.0253	0.0029	0.0001	0.1802	-0.0107	0.0125	0.2050	0.0183	0.434**
8	1000 Grain Weight (g)	0.0622	-0.0019	-0.0003	0.2331	0.0024	-0.0026	0.0104	0.3600	0.664**

Residual are 0.3615

Note: Bold figures in diagonal line indicate direct effect

* and ** Indicated significance at 5% and 1% level of probability, respectively.

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