Int.J.Curr.Microbiol.App.Sci (2024) *13*(11): 166-169

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 13 Number 11 (2024)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2024.1311.020

Studies on Correlation Coefficient for Yield and its Component Traits in Bread Wheat (*Triticum aestivum* L.)

Ajeet Singh[1], Sachin Kumar[1], Vipin Kumar Dwivedi[1], Shubham Mishra[1] and Ajeet Kumar[2*]

[1]Department of Genetics and Plant Breeding, Janta Vedic College, Baraut, Baghpat, CCS University, Meerut, India
[2]SVPUA&T Meerut, India

**Corresponding author*

Keywords

Correlation coefficient and bread wheat

Article Info

Received:
20 September 2024
Accepted:
28 October 2024
Available Online:
10 November 2024

A B S T R A C T

Experimental plot was conducted to the study of correlation coefficient of 13 parents line × tester mating design in bread wheat (*Triticum aestivum* L.) under the area of Department Genetics and Plant Breeding, Research Farm, J.V College, Baraut, U.P. during the *rabi* season 2019-20, 2020- 21 and 2021-22 was evaluated for correlation coefficient for 15 traits i.e., Days to booting, Day to heading, Day to anthesis, plant height, Number of productive tillers per plant, Days to maturity, spike length, Peduncle length (cm), Number of spikelets per spike, number of grains per spike, Number of grains per plant, Harvest index, 1000 grain weight (g), Biological yield per plant (g) and Grain yield per plant (g). Grain yield per plant showed a positive and significant correlation with number of productive tillers per plant, spike length, peduncle length, plant height, number of spikelets per spike, number of grains per spike, number of grains per plant, test weight, biological yield per plant and harvest at genotypic and phenotypic levels. The correlations may be help in the further research of the wheat breeding program.

Introduction

Wheat (*Triticum aestivum* L.) is the most important cereal crop for the majority of world's populations. Bread wheat (2n=6x=42) is the most commonly grown wheat crop in the world. India ranks 2nd in wheat production following rice. It is the most important staple food of about two billion people (36% of the world population). Wheat belongs to family Poaceae (Gramineae) which includes major crop plants such as wheat (*Triticum spp*. L.), barley (*Hordeum vulgare* L.), oat (*Avena sativa* L.), rye (*Secale cereal* L.), maize (*Zea mays* L.) and rice (*Oryza sativa* L.). Wheat is grown in all the states in India except Southern and North Eastern states. Uttar Pradesh, Haryana, Punjab, Rajasthan are the major wheat producing states and accounts for almost 80% of total production in India.

The total area, production and productivity of wheat are 30.47 million hectare, 106.84 million tonnes and 3507 Kg per hectare in India and in Uttar Pradesh the total area, production and productivity are 9.42 million hectare, 33.95 million tonnes and 3604 Kg per hectare, respectively (Agriculture Statistics at a glance, Ministry

of Agriculture, 2022). Such analysis has been employed to assess importance of various yield components by Sharma and Singh (2009). The major increase in the productivity of wheat has been observed in the states of Haryana, Punjab and Uttar Pradesh.

Materials and Methods

Thirteen parents line × tester mating design in bread wheat were evaluated for grain yield and its component traits in randomized block design with three replications during *rabi* season 2019-20, 2020- 21 and 2021-22 at Research Farm, J.V College, Baraut (U.P.). Each plot consisted of two rows of five meter length with row to row and plant to plant spacing of 22.5 and 5 cm, respectively. Observations were recorded on 15 traits i.e., Days to booting, Day to heading, Day to anthesis, plant height, Number of productive tillers per plant, Days to maturity, spike length, Peduncle length (cm), Number of spikelets per spike, number of grains per spike, Number of grains per plant, Harvest index, 1000 grain weight (g), Biological yield per plant (g) and Grain yield per plant (g). The Correlation coefficients were calculated as per the methods suggested by Searle (1961).

Results and Discussion

In the present investigation, the correlation coefficients were estimated among eleven characters at phenotypic and genotypic levels. The genotypic correlation coefficient was in general observed to be higher than that of phenotypic correlation coefficient, indicating the existence of strong inherent association for the various characters studied however, the phenotypic expression of the correlation was influenced by the environmental factors. Grain yield per plant showed a positive and significant correlation with number of productive tillers per plant (rg=0.421, rp=0.396), spike length (rg=0.458, rp=0.392), peduncle length (rg=0.341, rp=0.304), plant height (rg= 0.269, rp= 0.209), number of spikelets per spike (rg=0.754, rp=0.612), number of grains per spike (rg=0.276, rp=0.266), number of grains per plant (rg= 0.325, rp= 0.321), test weight (rg= 0.429, rp= 0.374), biological yield per plant (rg= 0.797, rp= 0.730) and harvest index (rg= 0.536, rp= 0.508) at genotypic and phenotypic levels. It showed a negative and significant correlation with days of booting (rg= - 0.465, rp= -0.432), days of heading (rg= -0.379, rp= -0.357), days of anthesis (rg= -0.411, rp= -0.382) and days of maturity (rg= -0.303, rp= -0.277) at genotypic and phenotypic levels. Similar findings were also found by Subhani *et al.,* (2000); Sherif *et al.,* (2005); Ayccek and Yildirim (2006); Khokhar *et al.,* (2010) and Kushwah *et al.,* (2021).

The correlation study showed that grain yield per plant showed a positive and significant correlation with number of productive tillers per plant, spike length, peduncle length, plant height, number of spikelets per spike, number of grains per spike, number of grains per plant, test weight, biological yield per plant and harvest index at genotypic and phenotypic levels. These associations indicated that improvement in grain yield can be achieved by improving above characters.

Table.1 Phenotypic and Genotypic correlation coefficients between different characters in wheat

Characters		DB	DH	DA	DM	NPT	SL	PL	PH	NSS	NGS	NGP	TW	BY	HI	GY
DB	**P**	**1.000**	0.833**	0.830**	0.487**	0.034	-0.020	-0.096	-0.117*	-0.299**	-0.072	0.149**	-0.355**	-0.124*	-0.471**	-0.432**
	G	**1.000**	0.884**	0.887**	0.517**	0.037	-0..38	-0.135**	-0.179**	-0.377**	-0.092	0.160**	-0.470**	-0.161**	-0.554**	-0.465**
DH	**P**		**1.000**	0.870**	0.397**	0.117*	0.087	-0.083	-0.060	-0.255**	-0.044	0.176**	-0.271**	-0.053	-0.451**	-0.357**
	G		**1.000**	0.912**	0.427**	0.125*	0.080	-0.118*	-0.119*	-0.328**	-0.064	0.182**	-0.338**	-0.070	-0.536**	-0.379**
DA	**P**			**1.000**	0.438**	0.093	0.067	-0.131**	-0.118*	-0.255**	-0.069	0.172**	-0.304**	-0.037S	-0.508**	-0.382**
	G			**1.000**	0.469**	0.106*	0.062	-0.168**	-0.201**	-0.327**	-0.097	0.177**	-0.393**	-0.062	-0.605**	-0.411**
DM	**P**				**1.000**	-0.072	-0.095	-0.131**	0.009	-0.183**	-0.123*	0.032	-0.102*	-0.054	-0.333**	-0.277**
	G				**1.000**	-0.077	-0.116	-0.177**	-0.024	-0.238**	-0.165**	0.034	-0.157**	-0.074	-0.398**	-0.303**
NPT	**P**					**1.000**	0.384**	0.243**	0.206**	0.338**	0.263**	0.565**	0.104*	0.533**	-0.089	0.396**
	G					**1.000**	0.437**	0.273**	0.272**	0.425**	0.307**	0.592**	0.123*	0.583**	-0.097	0.421**
SL	**P**						**1.000**	0.301**	0.165**	0.259**	0.384**	0.454**	0.065	0.430**	0.013	0.392**
	G						**1.000**	0.335**	0.215**	0.360**	0.470**	0.520**	0.078	0.534**	0.011	0.458**
PL	**P**							**1.000**	0.533**	0.286**	0.223**	0.328**	0.092	0.287**	0.093	0.304**
	G							**1.000**	0.586**	0.377**	0.226**	0.354**	0.051	0.304**	0.161**	0.341**
PH	**P**								**1.000**	0.242**	0.106*	0.299**	0.248**	0.350**	-0.103*	0.209**
	G								**1.000**	0.346**	0.055	0.365**	0.227**	0.410**	-0.077	0.269**
NSS	**P**									**1.000**	0.184**	0.287**	0.294**	0.484**	0.300**	0.612**
	G									**1.000**	0.227**	0.353**	0.383**	0.614**	0.439**	0.754**
NGS	**P**										**1.000**	0.543**	0.078	0.235**	0.102*	0.266**
	G										**1.000**	0.573**	0.045	0.220**	0.166**	0276**
NGP	**P**											**1.000**	-0.044	0.556**	-0.220**	0.321**
	G											**1.000**	-0.066	0.579**	-0.247**	0.325**
TW	**P**												**1.000**	0.250**	0.246**	0.374**
	G												**1.000**	0.227**	0.423**	0.429**
BY	**P**													**1.000**	-0.200**	0.730**
	G													**1.000**	-0.072	0.797**
HI	**P**														**1.000**	0.508**
	G														**1.000**	0.536**

*Significant at P = 0.05 and ** significant at P = 0.01

DB=Days of booting, DH=Days of heading, DA=Days of anthesis, DM=Days to maturity, NPT=No of productive tillers/plant, SL=Spike length (cm), PL=Peduncle length (cm), PH=Plant height (cm), NSS=No of spikelets/spike, NGS=No of grains/spike, NGP=No of grains/plant, GY=Grain yield/plant (gm), TW=Test weight, BY=Biological yield/plant (gm) and HI=Harvest index (%).

Author Contributions

Ajeet Singh: Investigation, formal analysis, writing—original draft. Sachin Kumar: Validation, methodology, writing—reviewing. Vipin Kumar Dwivedi:—Formal analysis, writing—review and editing. Shubham Mishra: Investigation, writing—reviewing. Ajeet Kumar: Resources, investigation writing—reviewing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

References

Agriculture Statistics at a glance, Ministry of Agriculture 2022 (p 30-31)

Ayccek, M. and Yildirim, T. (2006). Path coefficient analysis of yield and yield components in bread wheat (*Triticum aestivum* L.). Pakistan J. of Botany, 38(2): 417-424.

Khokhar, M.; Hussain, M.; Javed, Anear.; Zulkiffal, M.; Iqbal, M. M.; Khan, S. B.; Khan, M A.; Abdul, Qayyum.; Sabir, W. and Shahid, Mehmood. (2010). Correlation and path-analysis for yield and yield contributing charcters in wheat (*Triticum aestivum* L.). Acta Agriculture Serbica. 15(29): 19-24.

Kushwah, A., Sikarwar, R. S., Vishwakarma, M., Tiwari, S., & Singh, S. (2021). Relationship among the yield and its yield contributing traits in spring wheat (*Triticum aestivum* L.). The Pharma Innovation Journal, 10(9): 1974-1977.

Searle, S. R. 1961. Phenotypic, genotypic and environmental correlations. Biometrics. 17(3): 474-480.

Sharma, A. and Singh, H. (2009). Correlation and path coefficient analysis of yield and yield component of wheat. Advances in Plant Sciences 22: (1) 293-295.

Sherif, H. S.; Hosary, E. L.; Behit, M. M.; Moustafa, M. A.: Maghraby, M. A. (2005). Correlation and path coefficient analysis of yield characters in bread wheat (*Triticum aestivum* L.) Annals of Agricultural Sciences Moshtohor. 43(4): 1677-1687.

Subhani, G. M. (2000). Correlation and path coefficient analysis in bread wheat under drought stress and normal conditions. Pakistan J. Biological Sci, 3(1): 72-77. https://doi.org/10.3923/pjbs.2000.72.77

How to cite this article:

Ajeet Singh, Sachin Kumar, Vipin Kumar Dwivedi, Shubham Mishra and Ajeet Kumar. 2024. Studies on Correlation Coefficient for Yield and its Component Traits in Bread Wheat (*Triticum aestivum* L.). *Int.J.Curr.Microbiol.App.Sci.* 13(11): 166-169. **doi:** https://doi.org/10.20546/ijcmas.2024.1311.020