

## Character Association for Yield and Yield Attributing Traits in Diverse Genotypes of Garden Pea (*Pisum sativum* var *hortense* L.)

Sana Afreen, Anand Kumar Singh, Durga Prasad Moharana,  
Vaibhav Singh, Pushendra Singh, Abhilash Swaroop  
Mahapatra, Bhagat Singh

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**Abstract** The present experiment was conducted in order to estimate the character association for 15 quantitative traits in 21 diverse genotypes of garden pea during *rabi* season of 2011-12. The correlation studies revealed that pod yield per plant exhibited highly positive and significant character association with days to 50% flowering, days to 1<sup>st</sup> flowering, days to 100% flowering while it was negatively significant for number of primary branches per plant.

**Keywords** *Pisum sativum* var *hortense* L., Character association, Quantitative traits, Phenotypic and genotypic correlation.

### Introduction

Garden pea (*Pisum sativum* var *hortense* L.), being one of the most important member of Leguminosae family, is grown all over the world for the purpose of

both fresh market as well as for the processing industry. In virtue of its eye catching nutritive values, particularly proteins and other health promoting substances like carbohydrates, vitamin A, vitamin C, calcium and phosphorus, it plays an important role in combating the malnutrition. It is one of the most popular off season vegetable crop grown in North-Western Himalaya region in India. It is grown commercially as a winter crop in the Northern Indian plains and as a summer crop in the high hills. For development of effective breeding program clear cut understanding of the character association between yield and yield attributing traits is of utmost importance. Yield is a major consideration for any breeding program and is made up of several sub traits, each under separate genetic control. Since selection is usually practiced for changing two or more than two characters simultaneously, so the information on inter-relationship of important quantitative traits is useful in the prediction of correlated response to direct the selection for determining the selection indices and detection of characters which may have no value in themselves but are useful as indicators of other important characters as described by Robinson et al. [1]. Therefore the present investigation was conducted in order to estimate the character association in pea so that the desired targets can be achieved successfully.

### Materials and Methods

The present investigation was planned and executed

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S. Afreen, A. K. Singh, D. P. Moharana\*, V. Singh, P. Singh,  
A. S. Mohapatra, B. Singh  
Department of Horticulture, Institute of Agricultural Sciences,  
Banaras Hindu University, Varanasi 221005, (UP), India  
e-mail: dpmhort03@gmail.com

\*Correspondence



**Table 1.** Continued.

Characters	Average pod weight (g)	No. of pod per plant	Seed weight per pod (g)	Seed yield per plot (g)	Seed yield (q/ha)	Pod yield per plant (g)	Pod yield per hectare (q/ha)
Days to 1 <sup>st</sup> flowering	0.29	0.03	0.08	0.17	0.17	0.98**	0.98**
Days to 50% flowering	0.26	0.06	0.05	0.21	0.21	0.99**	0.99**
Days to 100% flowering	0.19	0.12	0.04	0.16	0.16	0.97**	0.97**
Length of pod (cm)	-0.01	0.05	0.78**	-0.54**	-0.54**	-0.02	-0.01
Width of pod (cm)	-0.34	0.28	-0.58**	-0.07	-0.07	-0.30	-0.30
No. of primary branches per plant	-0.84**	0.65**	0.17	-0.29	-0.29	-0.66**	-0.66**
Plant height (cm)	-0.11	0.01	-0.54**	0.49**	0.49**	-0.11	-0.11
No. of seeds per pod	-0.28	0.197	0.74**	-0.35	-0.35	-0.27	-0.26
Average pod weight (g)	-	-0.92**	-0.34	-0.22	-0.22	0.28	0.28
No. of pods per plant		-	0.24	0.18	0.18	0.08	0.08
Seed weight per pod (g)			-	-0.33	-0.33	-0.33	-0.33
Seed yield per plot (g)				-	0.99**	0.07	0.07
Seed yield (q/ha)					-	0.07	0.07
Pod yield per plant (g)						-	0.99**

correlation coefficient with number of primary branches per plant (-0.50). Days to 100% flowering exhibited negative significant genotypic correlation with number of primary branches per plant (-0.51). Length of pod showed positive significant genotypic correlation coefficient with width of pod (0.59), number of seeds per pod (0.72) and seed weight per pod (0.78), whereas, it exhibited negative significant genotypic correlation with plant height (-0.64), seed yield per plot (-0.54) and seed yield per hectare (-0.54). Width of pod recorded positive significant genotypic correlation with number of seeds per pod (0.46) and seed weight per pod (0.58). Number of primary branches per plant had positive significant genotypic correlation coefficient with number of pods per plant (0.65), whereas, it showed negative significant genotypic correlation with average pod weight (-0.84). Plant height recorded positive significant genotypic correlation coefficient with seed yield per plot (0.49) and seed yield per hectare (0.49), whereas, it had negative significant genotypic correlation with seed weight per pod (-0.54). Number of seeds per pod revealed positive significant genotypic correlation with seed weight per pod (0.74). Average pod weight showed negative significant genotypic correlation with number of pods per plant (-0.92)

On the other hand the phenotypic correlation coefficient of days to 1<sup>st</sup> flowering showed positive

significant association with days to 50% flowering (0.94) and days to 100% flowering (0.89) while it had negative significant phenotypic correlation with number of primary branches per plant (-0.42). Days to 50% flowering exhibited significant positive phenotypic correlation coefficient with days to 100% flowering (0.95). Length of pod exhibited positive significant phenotypic correlation coefficient with width pod (0.57), number of seeds per pod (0.68), seed weight per pod (0.65) while it showed negative significant phenotypic correlation coefficient with plant height (-0.55), seed yield per plot (-0.46) and seed yield per hectare (-0.46). Width of pod recorded positive significant phenotypic correlation coefficient with number of seeds per pod (0.44) and seed weight per pod (0.47). Number of primary branches per plant showed positive significant phenotypic correlation coefficient with number of pods per plant (0.53) and it showed negative phenotypic correlation coefficient with average pod weight (-0.63). Number of seeds per pod exhibited positive significant phenotypic correlation coefficient with seed weight per pod (0.67). Average pod weight recorded negative significant phenotypic correlation with number of pods per plant (-0.93). Seed yield per plot showed highly significant positive significant phenotypic correlation coefficient with seed yield per hectare (0.99). Such reports were earlier presented by Sharma et al. [3], Singh et al. [4] and Devi et al. [5].

**Table 2.** Phenotypic correlation (P) among yield and yield attributes for 15 characters in 21 genotypes of garden pea.\*Significant at 5% levels. \*\*Significant 1% level.

Characters	Days to 1 <sup>st</sup> flowering	Days to 50% flowering	Days to 100% flowering	Length of pea pods (cm)	Width of pea pods (cm)	No. of primary branches per plant	Plant height (cm)	No of seeds per pod
Days to 1 <sup>st</sup> flowering	-	0.94**	0.89**	0.08	0.04	-0.42*	0.28	0.25
Days to 50% flowering		-	0.95**	0.08	-0.08	-0.41	0.26	0.28
Days to 100% flowering			-	0.00	-0.16	-0.42*	0.28	0.23
Length of pod (cm)				-	0.57**	0.22	-0.55**	0.68**
Width of pod (cm)					-	0.32*	-0.17	0.44*
No. of primary branches per plant						-	-0.05	0.21
Plant height (cm)							-	-0.22
No. of seeds per pod								-
Average pod weight (g)								
No. of pods per plant								
Seed weight per pod (g)								
Seed yield per plot (g)								
Seed yield (q/ha)								
Pod yield per plant (g)								

**Table 2.** Continued.

Characters	Average pod weight (g)	No. of pods per plant	Seed weight per pod (g)	Seed yield per plot (g)	Seed yield (q/ha)	Pod yield per plant (g)	Pod yield per hectare (q/ha)
Days to 1 <sup>st</sup> flowering	0.10	0.04	0.07	0.14	0.14	0.38**	0.38
Days to 50% flowering	0.10	0.02	0.06	0.14	0.14	0.38**	0.38
Days to 100% flowering	0.07	0.05	0.05	0.11	0.11	0.35**	0.35
Length of pod (cm)	-0.02	0.04	0.65**	-0.46*	-0.46*	0.00	0.00
Width of pod (cm)	-0.23	0.19	0.47*	-0.03	-0.03	-0.17	-0.17
No. of primary branches per plant	-0.63**	0.53**	0.15	-0.23	-0.23	-0.37**	-0.37
Plant height (cm)	-0.07	0.02	-0.38	0.31	0.31	-0.07	-0.07
No. of seeds per pod	-0.17	0.15	0.67**	-0.31	-0.31	-0.09	-0.08
Average pod weight (g)		-0.93**	-0.18	-0.05	-0.05	0.34	0.34
No. of pods per plant			0.18	0.03	0.03	0.01	0.01
Seed weight per pod (g)				-0.29	-0.29	-0.05	-0.05
Seed yield per plot (g)					0.99**	0.00	0.00
Seed yield (q/ha)						0.00	0.00
Pod yield per plant (g)							0.99**

Data revealed that the most important trait i.e. pod yield per plant showed positive and significant genotypic correlation with days to 50% flowering, days to 1<sup>st</sup> flowering and days to 100% flowering. This is in conformity with the results presented by Togay et al. [6] and Million [7].

## References

1. Robinson HF, Comstock RE, Harvey PH (1951) Genotypic and phenotypic correlations in corn and their implications in selection. *J Agron* 43 : 282—287
2. Panse VG, Sukhatme PV (1967) Statistical methods for agricultural workers. ICAR, New Delhi.
3. Sharma AK, Singh SP, Sharma MK (2003) Genetic variability, heritability and character association in pea (*Pisum sativum* L.). *Crop Res* 26 : 135—139.
4. Singh JD, Singh IP (2006) Genetic variability, heritability, expected genetic advance and character association in field pea (*Pisum sativum* L.). *Leg Res* 29 : 65—67.
5. Devi PO, Pant SC, Rawat SS, Rana DK, Singh NIK (2010) Correlation coefficient and genetic divergence analysis in garden pea (*Pisum sativum* var *hortense* L.). *Ind J Hort* 67 : 160—165

6. Togay N, Togay Y, Yildirim B, Dogan Y (2008) Relationships between yield and some yield components in pea (*Pisum sativum* ssp. *arvense* L.) genotypes by using correlation and path analysis. *Afr J Biotech* 7 : 4285—4290.
7. Million F (2012) Variability, heritability and association of some morpho-agronomic traits in field pea (*Pisum sativum* L.) genotypes. *Pak J Biol Sci* 15 : 358—366.