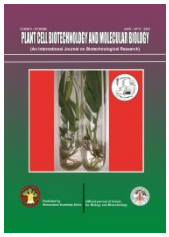

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Estimation of Correlation Coefficient Analysis for Yield and Component Traits in Field Pea (*Pisum sativum* L.)

Parth [a*], Vivek Kashyap [b], Shivendra Pratap Singh [c*], Shweta Dikshit [d], Pooshpendra Singh Dixit [e], Navneet Singh [f], Saurabh Raj Pandey [g], Budhesh Pratap Singh [h] and Dharm Veer Singh [i]

[a] Department of Horticulture, Post Graduate College, Gazipur, V. B. S. Purvanchal University, Jaunpur, Uttar Pradesh, India.
[b] Department of Plant Protection, Krishi Vigyan Kendra, Deoghar, Jharkhand, India.
[c] Department of Plant Breeding, Krishi Vigyan Kendra, Belipar, Gorakhpur, Uttar Pradesh, India.
[d] Department of Molecular and Cellular Engineering, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India.
[e] Department of Vegetable Science, C. S. Azad University of Agriculture and Technology, Kanpur, Uttar Pradesh, India.
[f] Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya, Uttar Pradesh, India.
[g] Department of Agronomy, Banaras Hindu University, Varanasi, Uttar Pradesh, India.
[h] Department of Vegetable Science, Chandra Shekhar Azad University of Agriculture and Technology, Kanpur, Uttar Pradesh, India.
[i] Department of Genetics and Plant Breeding, B.U.A. & T., Banda, Uttar Pradesh, India.

Authors' contributions

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

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**Corresponding author: E-mail: shivendraprsingh789@gmail.com*;

ABSTRACT

The present investigation entitled “Estimation of Correlation Coefficient Analysis for Yield and Component Traits in field pea (*Pisum sativum* L.)” for 10 characters. The experiment comprising of 23 genotypes of pea were grown in a Randomized Block Design (RBD), with three replications at Research Farm, Department of Genetics & Plant Breeding, Post Graduate College, Ghazipur, during *rabi* season of 2017-2018, plant to plant and row to row distance was kept 10 cm and 45 cm, respectively. The maximum positive and significant phenotypic correlation coefficient (0.834) was found between seed yield per plant, biological yield per plant. Positive and significant correlations were observed between seed yield per plant and number of pods per plant, plant height. Positive and significant correlations were also recorded between biological yield per plant and plant height, number of pods per plant. Similarly number of pods per plant had positive and significant correlation with plant height.

Keywords: Randomized block design; correlation.

1. INTRODUCTION

Field pea (*Pisum sativum* L.) is the most important legume crop in India, belongs to leguminous family, largely confined to cool temperate zone between the tropic of cancer and Mediterranean region. Peas are a rich source of protein having essential amino acids particularly lysine. This considered the cheapest source of protein in diet.

Field pea (*Pisum sativum* L.) is a self-pollinated *rabi* pulse crop which is grown for food, feed and vegetables. There are two types of peas grown in India viz., rain type and vegetable type. Field pea is used for seed, hay, pasture, silage, and green manure. It is rich in phosphorus and calcium; and is also, a good source of vitamins, especially vitamins A and D. These qualities make field peas one of the best feeds for animals and almost indispensable for efficient, economical livestock feeding.

Pulses occupy 78 million hectares area and contribute 70 million tonnes of produce to the world. Total food grain production [1]. The world. Major producers of pulses are India (23.1%), Canada (6.7%), China (12.1%), Myanmar (7.6%), and Brazil4.0%), which together account for half of the global output. In India, pulses are grown in about 23.47-million-hectare areas and produce nearly 18.34 million tonnes with a productivity of 781 kg/hectare [2].

In India, field pea occupies an area of 0.37 million hectares with annual production of 0.35 million tonnes. Its productivity in India is 945.9 kg ha-1 as against the world average of 772.3 kg per ha (Anonymous 2011). In Chhattisgarh, field pea is cultivated in 14.46 thousand hectares with annual production of 5.0 thousand metric tonnes and productivity of 346 kg per ha [1].

According to the Indian Institute of Pulses Research, Kanpur vision document, India population is expected to touch 1.68 billion by 2030 and the pulse requirement for the year 2030 is projected at 32 million tons with an anticipated required annual growth rate of 4.2%. Therefore, there is a need for a high-yielding variety of field peas having a good quality seed for multiple purposes. The field pea is also grown for dry seeds used as pulse (split seeds) or as flour and as a whole in the form of chhola, chat. The vegetable pea is cultivated for green seed and used as fresh, frozen, or canned vegetables.

A good swelling capacity leads to better cooking quality and quicker sprouting, which is ultimately desirable to the end user. Thus, if we consistently produce field pea grain with a high swelling capacity, it will benefit the reputation of field peas overseas. Un-swelled seeds when processed cause losses during sprouting and may reduce cooking quality. In crop rotation, they remain dormant in the soil in the year when they are planted but then emerge in subsequent crops. Indirect selection in such a situation is more effective and the study of correlation among different economic traits is, therefore, essential for an effective selection program because selection for one or more traits results in correlated responses for several other traits [3]. Hence, the knowledge of the genotypic and phenotypic correlation between yield and its contributing characteristics is very essential.

2. MATERIALS AND METHODS

The experimental materials were grown in a Randomized Block Design with three replications

at Research Farm, Department of Genetics & Plant Breeding, Post Graduate College, Ghazipur during the *rabi* season of 2017-2018. Planting distance plant to plant and row to row is kept at 10 cm and 50 cm. respectively. All the recommended agronomical practices were adopted to ensure good performance of the crop. Materials for the present investigation comprised 23 genotypes of pea (*Pisum sativum* L.) collected from N.D. University of Agriculture & Technology, Kumarganj, Ayodhya-224229.

3. RESULTS AND DISCUSSION

The present investigation entitled "Estimation of Correlation Coefficient Analysis for Yield and Component Traits in field pea (*Pisum sativum* L.)" for all traits. The experiment comprising 23 genotypes of pea were grown in a Randomized Block Design. Knowledge about the magnitude of the correlation coefficient between yield and yield component characters greatly helps the breeder in selecting useful characters influencing yield. In the present investigation, the maximum positive and significant phenotypic correlation coefficient (0.834) was found between seed yield per plant and number of pods per plant followed by seed yield per plant with biological yield per plant and plant height. Consequently, biological yield per plant showed a positive and significant correlation with number of pods per plant and plant height. The number of pods per plant showed a positive and significant correlation with plant height. Similarly, the days to 50% flowering had a positive and significant correlation with days to maturity on the other hand harvest index showed negative and significant correlations with days to 50% flowering. Singh [4] reported pea positive and significant correlation between seed yield and biological yield. Similarly, plant height also had a positive and significant correlation with the number of pods per plant. Similar finding reported by Ban, S. J. et al [5], Lal B. and Devi B. [6], Pal, A. K. and Singh, S. [7], Panwar S. et al. [8], Rathi, R. K. et al. [9] and Singh, S. K. et al. [10].

Direct components of yield like the number of pods per plant, number of seeds per pod, biological yield, harvest index, and 100-seed weight showed positive and significant correlations with seed yield and other characteristics. Thus, yield contributing characters will allow to breeder to make a breeding methodology on these characters for yield improvement in pea. The number of pods per plant showed a positive and significant correlation with seed yield and harvest index and biological yield indicating that increasing the biological yield leads to more yield. Therefore, present investigation indicates that higher performance of the above-considering yield contributing traits gives better seed yield and a desirable combination has resulted due to simultaneous selections for these characters (Table 1). Similar finding reported by Panwar S. et al. [8], Rathi, R. K. et al. [9] and Srivastava A. et al. [11].

Table 1. Phenotypic correlation coefficients among ten quantitative characters in pea

Characters	Days to maturity	Plant height (cm)	Pod length (cm)	Number pods per plant	Number of seeds/ pod	0-seed weight (g)	Biological yield (g)	Harvest index (%)	Seed yield / plant(g)
Days to 50% flowering	0.4967*	0.0867	-0.2310	0.1534	-0.2123	0.2774	0.2281	-0.4096*	0.0635
Days to maturity		-0.1643	0.1650	-0.0361	-0.2292	0.3560	-0.1536	0.0957	-0.0254
Plant height(cm)			-0.2724	0.5505**	0.1796	0.2242	0.5451**	0.0706	0.4834*
Pod length(cm)				-0.3284	-0.1982	0.0742	-0.3256	0.1581	-0.2671
Number of pods per plant					-0.0485	0.1209	0.9023**	-0.1424	0.8344**
Number of seeds per pod						0.0810	0.0511	0.0445	-0.0129
100-seed weight(g)							0.1380	-0.2585	0.1442
Biological yield / plant(g)								0.2436	0.8084**
Harvest index(%)									0.2581

4. SUMMARY AND CONCLUSION

The present investigation entitled “Estimation of Correlation Coefficient Analysis for Yield and Component Traits in field pea (*Pisum sativum* L.)” for all characters. The experiment comprising of 23 genotypes of pea were grown in a Randomized Block Design (RBD), with three replications at Research Farm, Department of Genetics & Plant Breeding, Post Graduate College, Ghazipur, during *rabi* season of 2017-2018, plant to plant and row to row distance was kept 10 cm and 45 cm, respectively. The maximum positive and significant phenotypic correlation coefficient (0.834) was found between seed yield per plant and number of pods per plant followed by seed yield per plant with biological yield per plant and plant height. Consequently biological yield per plant showed positive and significant correlation with number of pods per plant and plant height. Number of pods per plant showed positive and significant correlation with plant height. Similarly the days to 50% flowering had positive and significant correlation with days to maturity on the other hand harvest index showed negative and significant correlations with days to 50% flowering.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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