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Short communication

GENETIC VARIABILITY, ESTIMATION FOR VARIOUS CHARACTERS IN PEA (*PISUM SATIVUM*) FOR MOLLISOL OF UTTARAKHAND

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ABSTRACT: Under the present study an attempt has been made for the genetic variability of Pea (*Pisum sativum* L.) on the experimental field of Pantnagar Agricultural University at Uttarakhand on mollisol. The Randomized Completely Block Design with 3 replications has been used for the field experiment with 30*10 cm distance. Under the study 10 quantitative characters are taken for the genetic variability, viz. Days to first flowering, Node of first flowering, Number of primary branches per plant, Plant height (cm), Number of pods per plant, Pod length (cm), Pod weight (g), Number of seeds per pods, 100-seed weight (g) and Green pod yield per hectare. Out of these 10 characters the coefficient of variance of green pod yield per hectare is maximum (20.97 %) fallowed by primary branches per plant (17.88 %) and 100-seed weight (17.22 %).
Key Words: Coefficient of variance, genetic variability, grain yield and pea.

INTRODUCTION

Pea (*Pisum sativum* L.) 2n = 2x = 14 one the most important annual herbaceous legume crop of India, belongs to the family Leguminosae (Fabaceae). It is largely confined to cooler temperate zone between the tropic of cancer and Mediterranean region. Being a cool season crop, it is most extensively grown in the temperate region throughout the world. In tropics and subtropics, its cultivation is restricted to cooler altitude and winter season. In India, pea is cultivated over an area of 36.5 million ha with an annual production of 302.06 million mt. [2]. Statistics exhibits that it covered an area of 12.4 thousand hectares with an annual production of 71 thousand mt with a productivity of 6.6 tons per hectares in the state [2]. Green peas are eaten cooked as a vegetable, and are marketed fresh, canned, or frozen while ripe dried peas are used as whole, split, or made into flour.

Peas are rich in health benefiting phyto-nutrients, minerals, vitamins and anti-oxidants. They are relatively low in calories when compared with beans, and cowpeas. Fresh pea pods are excellent source of folic acid, ascorbic acid (vitamin C) vitamin K. They also contain phytosterols especially ß-sitosterol. Fresh green peas also contain adequate amounts of anti-oxidants flavonoids such as carotenes, lutein and zeaxanthin as well as vitamin-A. In addition to folates, peas are also good in many other essential B-complex vitamins such as pantothenic acid, niacin, thiamine, and pyridoxine. Furthermore, they are rich source of many minerals such as calcium, iron, copper, zinc and manganese. Lack of sufficient genetic variability for economically important character is one of the reasons attributed for in significant progress in crop improvement. The natural selection over years operated towards increasing the potentiality for survival and wider adoption at the cost of yield traits. Futher the ones contributing for higher yield seems to be scattered in the natural population. A great extent of variability has been observed in different agronomic characters of Pea with respect to plant height, days to flowering, pod length, and seed weight. Pea (*Pisum sativum* L.) is one of the important commercial crops and deserves attention offers to a breeder. The extent of variability existed in the germplasm, offers a better opportunity to select desirable genotype and a subsequent study of variability and interrelations among the different characters helps to proceed further for effective selection. The basic information which a plant breeder usually needs for production breeding in a particular crop species is the extent of genetic variability present in the available germplasm; larger variability ensures better chances of producing new derived forms Collection of germplasm from different sources provides raw material to the plant breeder. An access to wide variety of these resources constitutes an essential component of successful crop improvement programmes.

In the present study, an attempt was made to study the genetic variability, correlation between pod yield and its component characters and to know the direct and indirect effects of the component characters on pod yield by computing path coefficient analysis. In order to evaluate and compare the performance of fifty genotypes of Pea with respect to plant growth characters, maturity and yield, the present study was undertaken during the period of October, 2010 to Feburary, 2011 and the salient findings obtained in the present investigation have been discussed as follows.

MATERIALS AND METHODS

Estimation of Genetic Variability for Various Characters In Pea (*Pisum Sativum L.*). Ten parents and their forty F_2 progenies in Pea (*Pisum sativum* L.) were evaluated for genetic variability during the year 2010-2011 at Vegetable Research Centre (VRC), G. B. Pant University of Agriculture and Technology, Pantnagar, U. S. Nagar (Uttarakhand).Genetic variability, correlation and path coefficient analysis were worked out to understand the relative importance of one character over other influencing pod yield. The details of materials used and procedures followed during the course of investigation have been described below:

Experimental Site

Vegetable Research Centre, Pantnagar is situated in the foot hills of Shivalik range of Himalayas in the narrow belt called Tarai. Geographically, it is situated at an altitude of 243.84 m above mean sea level, and between 29°N latitude and 79.3° East longitude.

The climate of Pantnagar is humid subtropical. The monsoon starts in the month of June and often remains active up to September. The summer is humid dry and hot whereas winter is cool. Sometimes frost may occur occasionally. Light rain occurs during winter season also.

Experimental Design

The details of the experimental plan are given below:

Design of experiment	Randomized Completely Block Design
Number of genotypes	50
Row to row distance	30 cm
Plant to plant distance	10 cm
Number of replications	3

Details of Observations

The observations were recorded on 10 quantitative characters. Five randomly selected plants were tagged in each row and used for recording the observations of characters which are given below:

Quantitative characters

1. Days to first flowering.
2. Node of first flowering.
3. Number of primary branches per plant.
4. Plant height (cm).
5. Number of pods per plant.
6. Pod length (cm).
7. Pod weight (g).
8. Number of seeds per pods.
9. 100-seed weight (g).
10. Green pod yield per hectare.

The mean values of each genotypes in each replication for all the traits were subjected to statistical analysis as per Randomized Completely Block Design.

Mean was calculated as the arithmetic mean of values for each character as given below:

$$\overline{X} = \frac{\sum X_i}{n}$$

Where;

$\overline{X}$ = Mean
X_i = Value of i^{th} plant for a character
n = Number of plants

Variance:

Variance was estimated as the mean squared deviation as given below:

$$V = \frac{1}{n-1}\sum i = I\left(Xi - \overline{X}\right)^{\hat{2}}$$

Coefficient of variation (C.V.):

Coefficient of variation was worked out in per cent by using the formula given below:

$$CV = \frac{SD}{\overline{X}} \times 100$$

SD = Standard deviation is square root of variance.

RESULTS AND DISCUSSION

Collection of germplasm from different sources provides raw material to the plant breeder. An access to wide variety of these resources constitutes an essential component of successful crop improvement programmes. Pea (*Pisum sativum* L.) is one of the important commercial crops and deserves attention offers to a breeder. The extent of variability existed in the germplasm, offers a better opportunity to select desirable genotype and a subsequent study of variability and interrelations among the different characters helps to proceed further for effective selection. The basic information which a plant breeder usually needs for production breeding in a particular crop species is the extent of genetic variability present in the available germplasm; larger variability ensures better chances of producing new derived forms. [3] Found same result on pea for different genetic character for Bangaladesh. [4] reported that genetic diversity among varieties & wild species of pea on the basis of morphological, physiological characters and molecular marker. In order to evaluate and compare the performance of fifty genotypes of Pea with respect to plant growth characters, maturity and yield, the present study was undertaken during the period of October, 2010 to Feburary, 2011.

Coefficients of variation

The genotypic coefficients of variations was observed for days to flowering (12.3), node of first flower (11.48), number of primary branches per plant (17.88), plant height (12.15), number of pods per plant (10.58), pod length (7.99), number of seeds per pod (7.07), weight of seeds per plant (13.59), 100-seed weight (17.22) and green pod yield per hectare(20.97). Similar result has been on genetic variability of Black gram *(vigna mungo L Hepper)* for Islamabad district of Pakistan [1]. Reported molecular diversity of different (16) Agro-ecological region of India on various pulse crop. [5] Reported same result on pea for Meerut District of Uttar Pradesh on 48 field pea crosses.

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