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E: ISSN NO.: 2455-0817 *Remarking An Analisation*

Character Association and Path Analysis for Yield and Its Attributing Traits in Cucumber

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Abstract

Genetic variability, correlation coefficient and path coefficient analysis were conducted using twenty genotypes of *Cucurmis sativus*. In the present study the phenotypic coefficient of variation which measures the total variation was found to be greater than the genotypic coefficient of variation in majority of characters. The closer magnitude of GCV and PCV indicated that genotype had played greater role rather than environment. Wide variability was found for the plant parameters such as Days to seed germination, branch number per plant, plant height (cm), shoot diameter and Yield per plant. The highest GCV was recorded in yield per plant (42.76) followed by days to seed germination (30.90). Among the twenty cucumber germplasm, SB-3 gave the highest yield per plant (3.67kg). The correlation co-efficient revealed that, yield per plant had highly positive and significant association with average branch per plant and plant height. Path analysis showed that the shoot diameter directly contributed towards the yield per plant in the SB-3 cucumber.

Keywords: Correlation, Variability, Path Analysis, Growth, Yield And Cucumber.

Introduction

Cucumber (*Cucumis sativus* L.) is an important member of the family Cucurbitaceae, with a chromosome number 2n= 14, which comprises of 117 genera and 825 species in warmer part of the world. It is considered as 4th most important vegetable crop after tomato, cabbage and onion (Bhardwaj and Kumar, 2012). Cucumber is highly cross pollinated crop and predominantly monoecious in nature. It is thermophilic and frost susceptible crop, which require warm weather and bright light for its better growth and development, however it can be grown in both summer and rainy season, but it can't tolerate cold injury. Genetic diversity is the amount of heritable variability between varieties or population of organisms. Variability occurs from differences in DNA sequences, biochemical characteristics like protein structure or isoenzyme properties, physiological properties like resistance to illness and growth rate, and various morphological characters. Selection, mutation, genetic drift and gene flow also affect genetic diversity in different population by acting on the alleles in these populations. Selection is an important factor and can be divided into two types: natural and artificial. Artificial selection plays an important role in the variation of crop species (Kumar et al., 2011). In spite of being native of Indian sub-continent and endowed with enormous variability and genetic divergence, cucumber remains underutilized in terms of its economic potential and unexploited from breeding point of view. So there is a great need of Screening cucumber germplasm to select elite genotypes with improved quality and higher yield for direct selection or using as a parent in hybridization programme. Depending on genetic variability present in base population *viz.,* character association, cause and effect relationship, heritability and genetic advance breeders can make an effective selection in a breeding programme. Genetic variability increases the genetic potentiality and wider scope for improvement in the genotypes. To explore the purpose of improvement by selection it is essential to study first the extent of genetic variability and heritability along with genetic advance. Yield is a complex character influenced by several genetic factors interacting with environment and requires giving a better insight of the ancillary characters for better selection (Aurah et al., 2012). Correlation and path coefficient analysis are the important biometrical tools, which are effective for determining the various yield components of different crops

leading to selection of superior genotypes. Therefore, for a rational approach for the improvement of yield, it is essential to have information on the association between different yield components and their relative contribution to yield. Therefore, keeping in view the importance of above facts in minds, the present study has been undertaken to estimate the extent of variability, correlation and path analysis in different genotypes of cucumber..

Aim of Study

The research involves twenty genotypes of cucumber for assessing the genetic and phenotypic variability, correlation coefficient and path coefficient analysis so that we can select the suitable genotype on the performance of different growth and yield parameters studied and after confirming their performance we can recommend the best genotypes to the local farmers for their cultivation.

Material and Methods

The present investigation entitled "Study on genetic variability, correlation and path coefficient analysis in diverse genotypes of cucumber (*Cucumis sativus* L.)" was carried out at the Research Farm of University Teaching Department of Sri Satya Sai University of Technology and Medical Sciences, Sehore, (M.P.) during the summer season of 2016. Twenty genotypes were evaluated in RCBD design in three replications. Plant characters such as days to seed germination, branch number per plant, plant height (cm), shoot diameter and yield per plant were recorded in each entry/ replication. Ten plants from each entry were selected at random for recording observation. Collected data on yield and yield contributing characters under study were statistically analyzed to find out the significance of difference among the treatment means. The means for all the treatments were calculated. The analysis of variance for most of the characters under consideration was performed by F variance test. The significance of the difference between treatments means were evaluated by least significance difference (LSD) test for the interpretation of the results (Gomez and Gomez, 1984). According to the Dewey and Lu (1959), path coefficient analysis were done by using the simple correlation values. In path analysis, correlation coefficient is divided into direct and indirect effect of independent variable on the dependent variable.

Results and Discussion

Variability, correlation and Path analysis in respect of different plant characters, yield contributing characters of different cucumber genotypes are discussed below:

Days to Seed Germination

The analysis of variance indicated the existence of sufficient genetic variability among the 20 genotypes for all the plant characters. Days to seed germination as observed in this experiment varied significantly among the genotypes. The earliest days to seed germination in the field was found in SB-6 and SB-8 (4 days) which were statistically similar with the genotypes SB-2 and SB-3. Long days required for seed germination was found in genotype SB-16 (10.34 days), which was statistically similar with the genotypes SB-15 and SB-20. This finding was supported by Rajawat and Collis (2017).

Branch number per plant

Genotypic co-efficient of variation was found lower than the corresponding phenotypic one, which indicated the larger influence of environment.(Veena et al., 2012) found low value in cucumber (8.92 and 23.35), which indicating high environment influence on this trait.

Plant height

The analysis of variance indicated the existence of sufficient genetic variability among the 20 genotypes for all the plant characters. Plant height as observed in this experiment varied significantly among the genotypes. The lowest plant height in the field was found in SB-8 (40.82) which was statistically similar with the genotypes SB-19. Highest plant height was found in genotype SB-9 (55.32), which was statistically similar with the genotypes SB-13 and SB-16. This findings was supported by Golabadi et al. (2013).

Shoot diameter

The highest range of variation was recorded in shoot diameter and ranged from 13- 34 with the mean value of 23.50± 3.41. The plant of genotype SB-13 showed the lowest shoot diameter which was statistically similar with SB-10, SB-17 (Table3). The genotype SB-7 showed the maximum shoot diameter (27) followed by SB-3 but all were statistically same (Reshma and Hossain., 2011).

Yield Per Plant

The cultivars showed a significant difference in producing yield per plant and ranged from 1.17kg to 2.67kg (Table 2). From the above result, the data indicated that SB-3 (2.67kg) had the highest yield per plant followed by SB-10 (2.50kg), SB-1 (2.45kg) and SB-17 (2.42kg) which were statistically similar with each other. The genotype number SB-2 (1.17kg) had the lowest yield per plant followed by SB-4 (1.19kg) and SB-12 (1.34kg) which were statistically similar to each other but significantly different from the other genotypes. Hossain et al., 2010 also supports our results in their findings. By the present investigation we can suggest that branch number per plant and plant height are the main components of yield should be given priority in the selection programme and as well as variety development.

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Table 1

Plant characteristics in respect of Days to seed germination, Branch per plant, Plant height, Shoot diameter and Yield per plant.

Genotypes	DSG	BN	PH	SD	Y/P
SB-1	6.34	40.12	49.64	17.2	2.45
SB-2	4.34	32.18	47.22	21.4	1.17
SB-3	4.34	37.54	45.94	26.1	2.67
SB-4	5.34	36.10	53.28	22.6	1.19
SB-5	7.68	39.64	49.14	22.9	1.65
SB-6	4.00	37.40	46.96	18.4	2.00
SB-7	8.68	49.82	48.25	25.9	2.70
SB-8	4.00	36.02	*40.82*	22.1	2.30
SB-9	9.34	42.90	55.32	23.7	1.98
SB-10	8.34	43.22	53.78	15.6	2.50
SB-11	8.34	36.08	45.42	18.2	1.90
SB-12	4.68	42.62	53.04	22.8	1.34
SB-13	4.68	40.32	54.88	14.7	2.32
SB-14	7.34	48.20	53.64	23.6	1.98
SB-15	9.34	43.39	49.22	20.6	2.40
SB-16	10.34	44.88	54.44	18.3	2.08
SB-17	4.68	39.16	53.26	16.8	2.42
SB-18	4.34	36.82	45.86	27.0	2.26
SB-19	4.68	42.30	44.54	22.8	2.12
SB-20	9.68	41.50	46.06	17.1	2.36

Table-2

Estimates of parameters of characters, yield contributing characters of Cucumber

Characters	DSG	BN	PH	SD	Y/P
GV	3.43	6.19	8.92	17.15	0.26
PV	4.19	16.21	23.35	19.51	0.27
GCV	30.90	5.26	5.17	15.30	42.76
PCV	34.16	9.26	8.62	14.24	43.70
Range	4-10.34	3.57- 20.57	8.0- 26.51	13- 34	0.53- 2.70
Mean± SE	5.99±0.51	21.60±1.85	20.43±1.35	23.50±3.41	1.18±0.07
CV(%)	13.65	7.00	5.62	5.8	8.98

Table-3

Correlation coefficient among yield and yield contributing characters of Cucumber

Characters	BN	PH	SD	Y/P
BN		0.314**	-0.046	-0.163
PH			-0.136	-0.246
SD				0.527**

Table-4

Path Analysis showing direct and indirect effects on yield components of Cucumber

Characters	BN	PH	SD	Y/P
BN	0.00048	0.00465	-0.02336	-0.185
PH	0.00025	0.0135	-0.12387	-0.333
SD	-0.00003	-0.00308	0.036117	0.602