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Short Communication

Statistical analysis of seed yield and others components in Pigeonpea germplasm

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Abstract

The experiment was undertaken study on statistical analysis of seed yield and others components in pigeonpea. The experimental material consisted of 50 germplasm in randomized block design for 12 characters. The statistical analysis of seed yield and others components in pigeonpea germplasm material has been the basic requirement of the mean, range, critical variance, F test, standard error and critical difference analysis. In the present investigation, a wide range was observed for nearly all the traits viz., pod length, plant height, number of pod clusters per plant, days to flowering initiation, days to maturity, days to 50% flowering and seed yield per plant. Whereas, low performance has been observed for number of pods per plant, number of primary branches per plant, number of pods per clusters, 100 seed weight and number of seeds per pod. The Statistical analysis also provides information about the type of yield and vigour plant in the expression of various characters.

Keywords: Mean, range, critical variance, F test, standard error, critical difference, germplasm

Introduction

Pigeonpea [*Cajanus cajan* (L.) Millsp.] belonging to the Family Leguminosae (Fabaceae) Genus *Cajanus*, Species *Cajan*. It is one of the major food legumes of the world which is widely grown in tropical and subtropical regions and occupies an important position in the economy of India (Varshney *et al.*, 2012) [7]. In Chhattisgarh, acreage under pigeonpea is 51.9 thousand hectares with production and productivity of 31 thousand tonnes and 597 kg ha⁻¹, respectively (Anonymous, 2013) [1]. However, major constraints in growing pigeonpea in Chhattisgarh are water logging, drought at later stage and frost. Thus there is an urgent need to evolve high yielding, early-medium duration varieties which can tolerate moisture stress at later growth stage and low temperature with also coupled with high yield variety.

The field experiment was conducted during the *Kharif* 2012-13 at Department of Genetics & Plant Breeding at Research cum Instructional Farm, Indira Gandhi Krishi Viswavidyalaya, Raipur C.G.. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. The material was sown in single rows of 4.0 m length and 60 cm apart with 20 cm plant to plant spacing. Sowing of 50 germplasm was done in first week of June. Recommended dose of fertilizer of 20:50:20 kg per ha of NPK was applied in the rows before sowing. All the recommended package of practices were followed to raise a healthy crop. Single plant per hill was maintained, border rows were planted to eliminate the border effect. Five plants were randomly selected and tagged in each genotype per replication for recording the observations (Table-1) The data were analyzed for statistics by (Nadarajan and Gunasekaran, 2005) [2].

The character days to flowering initiation varied between 104.67 (ICPL-87) to 131.00 days (ICPL7001) with a mean value of 122.83 days and critical variance 1.13, F test 35.40, standard error 0.80, critical difference at 5% 2.24 and critical difference at 1% 2.97. The character days to 50% flowering varied between 127.33 (ICPL-87) to 149.00 days (ICP7405) with a mean value of 138.30 days and critical variance 1.90, F test 13.33, standard error 1.51, critical difference at 5% 4.25 and critical difference at 1% 5.63. Days to maturity varied between 173.33 (ICPL-87) to 196.00 days (ICP7004) and ICP7367) with a mean value of 186.39 days and critical variance 2.06, F ratio 7.17, standard error 2.22, critical difference at 5% 6.22 and critical difference at 1% 8.24. The plant height ranged from 98.93 (ICP6997) to 144.60 cm (ICPL 87119) with a mean value plant height of 121.27 cm. and critical variance 3.21, F test

24.46, standard error 2.25, critical difference at 5% 6.31 and critical difference at 1% 8.36. The number of primary branches per plant ranged between 6.13 (ICP6997) to 9.53 (ICPL 87119) with a mean value of 8.22 branches and critical variance 5.27, F test 8.33, standard error 0.25, critical difference at 5% 0.70 and critical difference at 1% 0.93. The number of pod clusters per plant ranged from 20.57 (ICP6996) to 64.60 (ICPL 87119) with a mean value of 41.67, critical variance 6.96, F test 61.24, standard error 1.67, critical difference at 5% 4.70 and critical difference at 1% 6.22. The number of pods per cluster ranged from 2.33 (ICP6997) to 3.67 (ICPL 87119) with a mean value was recorded 2.97 and critical variance 10.21, F ratio 2.35, standard error 0.17, critical difference at 5% 0.49 and critical difference at 1% 0.65. The number of pods per plant ranged from 48.07 (ICP6997) to 126.33 (UPAS-120) with a mean value was recorded 91.66, critical variance 3.94, F test 71.42, standard error 2.09, critical difference at 5% 0.586 and critical difference at 1% 7.75. The pod length ranged from 4.39 (ICP6997) cm to 5.90 (ICPL 87119) cm with a mean value 5.01, critical variance 4.82, F test 4.14, standard error 0.14, critical difference at 5% 0.39 and critical difference at 1% 0.52. The average number of seeds per pod was 3.81 and ranged from 3.27 (ICP6997) to 4.47 (BDN-2) for number of seeds per pod, and critical variance 4.97, F test 3.73, standard

error 0.11, critical difference at 5% 0.31 and critical difference at 1% 0.41. The mean value of 100 seed weight was 8.36 g and ranged from 6.87 (ICP7392) to 11.17 g (ICPL 87119) for 100 seed weight, critical variance 2.63, F test 57.34, standard error 0.13, critical difference at 5% 0.36 and critical difference at 1% 0.47. and seed yield per plant ranged from 12.72 (ICP6996) to 32.70 g (ICPL 87119) with a mean value 18.74 g. and critical variance 12.91, F test 4.65, standard error 1.40, critical difference at 5% 3.92 and critical difference at 1% 5.19.

The statistical analysis of seed yield and others components in pigeonpea germplasm material has been the basic requirement of the analysis. In the present investigation, a wide range was observed for nearly all the traits viz., pod length, plant height, number of pod clusters per plant, days to flowering initiation, days to maturity, days to 50% flowering and seed yield per plant indicated chance of genetic improvement in germplasm of pigeonpea. Whereas, low performance has been observed for number of pods per plant, number of primary branches per plant, number of pods per clusters, 100 seed weight and number of seeds per pod. These findings are in general agreement with the findings of Sinha and Singh (2005)^[5], Rathore (2008)^[4], Patel and Acharya (2011)^[3], Yerimani *et al.* (2013)^[8] and Tiwari *et al.* (2015)^[6].

Table 1: Statistical analysis of seed yield and others components Pigeonpea germplasm

S. No.	Characters Components	1	2	3	4	5	6	7	8	9	10	11	12
1	Mean	122.83	138.30	186.39	121.27	8.22	41.67	2.97	91.66	5.01	3.81	8.36	18.74
2	Range Lowest	104.67	127.33	173.33	98.93	6.13	20.57	2.33	48.07	4.39	3.27	6.87	12.72
3	Range Highest	131.00	149.00	196.00	144.60	9.53	64.60	3.67	126.33	5.90	4.47	11.17	32.70
4	Critical Variance (CV)	1.13	1.90	2.06	3.21	5.27	6.96	10.21	3.94	4.82	4.97	2.63	12.91
5	F ratio (Test)	35.40	13.33	7.17	24.46	8.33	61.24	2.35	71.42	4.14	3.73	57.34	4.65
6	F Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Standard Error (SE)	0.80	1.51	2.22	2.25	0.25	1.67	0.17	2.09	0.14	0.11	0.13	1.40
8	Critical Difference (CD) 5%	2.24	4.25	6.22	6.31	0.70	4.70	0.49	5.86	0.39	0.31	0.36	3.92
9	Critical Difference (CD) 1%	2.97	5.63	8.24	8.36	0.93	6.22	0.65	7.75	0.52	0.41	0.47	5.19

S. No.	Characters	S. No.	Characters	S. No.	Characters
1	Days to flowering initiation	5	No. of primary branches per plant	9	Pod length (cm)
2	Days to 50% flowering	6	No of pod clusters per plant	10	No. of seeds per pod
3	Days to maturity	7	No. of pods per cluster	11	100 seed weight (g)
4	Plant height (cm)	8	No. of pods per plant	12	Seed yield per plant (g)

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