International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(6): 2106-2108

Received: 13-09-2019
Accepted: 15-10-2019

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Short Note

Identification of donor for seed yield and its attributing traits in pigeonpea [*Cajanus cajan* (L.) Millsp.]

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Abstract
The experiment was undertaken to study on Identification of donor for seed yield and yield attributing traits in pigeon pea. The experimental material consisted of 12 parents *vies* 7 lines x 5 testers in randomized block design for 12 characters *viz.* days to flowering initiation, days to 50% flowering, days to maturity, plant height (cm), number of primary branches per plant, number of pod clusters per plant, number of pods per cluster, number of pods per plant, pod length (cm), number of seeds per pod, 100 seed weight (g), seed yield per plant (g) and others components in pigeon pea improvement breeding has been the basic requirement is general combining ability effect. In the present investigation, a wide range of variability observed for nearly all the traits *viz.* number of pods per plant, days to maturity, number of pod clusters per plant, days to 50% flowering, plant height and seed yield per plant. The studies general combining ability also provides information about the good combiners for pigeon pea breeding program with yield and vigours plant in the expression of various characters.

Keywords: GCA, line, tester, pigeon pea

Introduction
Pigeon pea [*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 under pigeon pea total area 51.9 thousand hectares with production and productivity of 31 thousand and 597 kg ha^{-1}, respectively (Anonymous, 2013) [2]. However, major constraints in growing pigeon pea in Chhattisgarh are water logging, drought at later stage and frost. Thus there is an urgent need to evolve high yielding cultivars, early-medium duration varieties which can tolerate moisture stress at later growth stage and low temperature coupled with high yield variety.The sowing of 12 parents and 35 crosses which were used for combining ability analysis by line x tester approach (Kempthome, 1957) [4] in the 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 was 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 (Singh and Chaudhary, (1985) [5].The estimates of general combining ability (GCA) all the characters are discussed as under, The estimates of general combining ability (GCA) effects of lines and testers for characters wise discussion of combining ability effects. Character wise results of combining ability effects described, the magnitude of variance for the gca for seed yield and its traits are given in Table 1. Days to flowering initiation significant gca effects of the parents for the traits ranged from -12.48 (ICPL-87) to 4.57 (BDN-2). The estimate of gca effects revealed that the parents ICPL-87, and ICP7391, had significant negative effects for the traits. Rest of the parents had positive significant gca effects for the trait in BDN-2, JKM-189, UPAS-120, ICP7406, ICPL 87119 and ICP7393, while, non-significant gca effect was noted for ICP7382, ICP7373, ICP7376 and ICP7004, the days to 50% flowering The significant gca effects among 12 parents for ranged from -14.86 (ICPL-87) to 6.10 (BDN-2). The highest significant negative gca effects for parents was recorded for ICPL-87 and ICP7391, However, the significant positive gca effects was exhibited by BDN-2 followed by JKM-189, ICP7406 and UPAS-120,

The days to maturity estimate of significant gca effects for the trait ranged from-12.54(ICPL-87) to 5.17(BDN-2). The highest significant negative gca effects for parents was recorded for ICPL-87 and ICP7373 the significant positive gca effects was exhibited by BDN-2 followed By JKM-189, ICP7406 and UPAS-120, the days to maturity estimate of significant gca effects for the trait ranged from -12.54 (ICPL-87) to 5.17 (BDN-2). The highest significant negative gca effects for parents was recorded for ICPL-87 and ICP7373 the significant positive gca effects was exhibited by BDN-2 followed by JKM-189, ICPL 87119, ICP7406 and ICP7393, plant height significant gca effects of the parents for the plant height ranged from -7.26 (BDN-2) to 4.71 (UPAS-120). The highest significant negative gca effects for parents was recorded for BDN-2 followed by ICP7004 and ICPL-87, the number of primary branches per plant significant gca effects of the parents from -1.03 (BDN-2) to 0.64 (UPAS-120). The highest significant negative gca effects was recorded BDN-2 followed by ICP7004, ICPL-87, However, the significant positive gca effects was exhibited by UPAS-120 followed by JKM-189, ICP7376, the number of pod clusters per plant significant gca effects of the parents for the ranged from -5.25 (ICP7373) to 4.11 (ICP7406). The highest significant negative gca effects was recorded ICP7373 followed by ICP7382, ICP7004, BDN-2 and ICP7391. The highest significant positive gca effect for number of pod clusters per plant ICP7406 followed by ICP7376 and ICP7393, the number of pods per cluster The significant gca effects of the parents for the ranged from -0.28 (ICP7393) to 0.41 (ICP7391). The highest significant negative gca effects was recorded ICP7393 followed by ICP7406 and BDN-2. The highest significantPositive gca effect for number of pod clusters per plant ICP7391 followed by ICPL-87, ICP7382 and ICP7376, the number of pods per plant The significant gca effects of the parents for the number of pods per plant ranged from -21.51 (BDN-2) to 10.46 (JKM-189).The highest significant negative gca effect was observed BDN-2 followed by ICP7004, ICP7391 and ICPL-87. The highest significant positive gca effect for JKM-189 followed by UPAS-120, ICP7376, ICPL 87119 and ICP7373, the pod length (cm) significant gca effects was observed of the parents for the ranged from -0.27 (ICP7406) to 0.25(ICP7393). The highest significant positive gca effect for ICP7406 followed by ICP7004 and UPAS-120. The highest significant negative gca effect ICP7393 was observed followed by JKM-189, ICP7376 and ICP7382, the Number of seeds per pod significant the significant positive gca effect number of seeds per pod was observed for 0.22 (ICP7004) and 0.14 (UPAS-120), the 100 Seed Weight (g) The highest significant negative gca effects was exhibited by parent ICP7373 followed by ICP7393, ICPL-87 and BDN. The highest significant positive gca effects was exhibited by parent ICP7004 followed by ICPL 87119, ICP7391, ICP7406 and UPAS-120, the Seed yield per plant (g) highest significant value of gca effects for this trait ranged from -8.07 (BDN-2) to 4.49 (JKM-189). The highest significant negative gca effects for seed yield per plant was observed in parent BDN-2 followed by ICP7004, ICP7391 and ICPL-87. The highest significant positive gca effects for seed yield per plant was observed in parent JKM-189 followed by UPAS-120, ICP7376, ICP7406 and ICPL 87119. The above findings are in conformity with the earlier reports of Bhavani and Bhalla (2010) [2] and Saroj *et al.* (2014) [4].

Table 1: Analysis of general combining ability effect (Line X Tester) in pigeon pea

Parents	Mean Squares											
	Characters											
	Days to flowering initiation	Days to 50% flowering	Days to maturity	Plant height (cm)	No. of primary branches per plant	No of pod clusters per plant	No. of pods per cluster	No. of pods per plant	Pod length (cm)	No. of seeds per pod	100 seed weight (g)	Seed yield per plant (g)
Lines												
ICP7004	-0.66	1.42	1.15	-3.31**	-0.48*	-2.15**	-0.10	-11.89**	-0.31**	0.22**	0.47**	-4.97**
ICP7373	-0.46	-0.43	-2.25*	2.53**	0.25	-5.25**	-0.11	2.73*	0.02	0.25	-0.47**	0.93
ICP7376	0.68	-0.38	-1.31	3.37**	0.51*	4.05**	0.15**	7.56**	0.18**	-0.05	-0.10	2.88**
ICP7382	-0.46	-0.31	-1.38	-1.36	-0.23	-3.09**	0.16**	1.26	0.17*	-0.11	-0.16	0.28
ICP7391	-4.66**	-3.98**	-1.91	-1.17	-0.14	-1.32	0.41**	-5.37**	0.06	-0.11	0.26**	-2.33**
ICP7393	2.81**	1.35	2.82**	-0.33	-0.02	3.65**	-0.28**	-0.13	0.25**	-0.05	-0.25**	0.35
ICP7406	2.74**	2.35**	2.89**	0.26	0.10	4.11**	-0.24**	5.84**	-0.37**	0.06	0.25**	2.86**
SE (Lines)	0.66	0.78	1.00	0.76	0.21	0.89	0.05	1.09	0.06	0.06	0.09	0.67
					Testers							
ICPL 87119	2.43**	1.86**	3.22**	0.62	0.18	1.04	-0.05	6.43**	0.01	0.01	0.28**	1.50*
BDN-2	4.57**	6.10**	5.17**	-7.26**	-1.03**	-1.87**	-0.11*	-21.51**	-0.05	-0.03	-0.15*	-8.07**
UPAS-120	1.29*	2.10**	0.89	4.71**	0.64**	0.28	-0.26	8.51**	-0.13*	0.14**	0.24**	3.96**
ICPL-87	-12.48**	-14.86**	-12.54**	-1.62*	-0.38*	-6.92	0.20**	-3.89**	-0.04	-0.09	-0.25**	-1.89**
JKM-189	4.19**	4.81**	3.27**	3.56**	0.59**	7.47	0.02	10.46**	0.21**	-0.02	-012	4.49**
SE (Tester)	0.56	0.66	0.54	0.64	0.18	0.58	0.04	0.92	0.05	0.05	0.07	0.57

*Significant at 5% probability level, ** Significant at 1% probability level

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