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Research Note

Genetic studies in pigeonpea (C*ajanus cajan* (L.) Mill sp)

D.Bhadru[1]

Acharya N.G. Ranga Agricultural University, Agricultural Research Station, Tandur, Andhra Pradesh
[1]Agricultural Research Station, Kampasagar, Babu Sai pet(Post), Thripuraram mandal, Nalgonda Dist., Andhra Pradesh, Acharya N.G. Ranga Agricultural University
Email: badri002gpb@yahoo.co.in

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Abstract:
Study was carried out for genetic variability, heritability and genetic advance of twelve characters in fifty white seed coated lines. High coefficient of variation for number of pods, seed yield per plant, plant height and raceme length and high values of heritability coupled with high genetic advance as % of mean were observed for number of pods, seed yield, primary and secondary branches per plant, plant height, raceme length, test weight, seeds per pod, pod length and plant spread.

Key Words: Genetic advance, Heritability, Variability

Pigeonpea is the second important pulse crop after chickpea in India. Andhra Pradesh is one of the major states of pigeonpea cultivation and Tandur division is the major pigeonpea growing area of this state. White seed coated pigeonpea fetches more market price in central and south zones of India, due to unique cooking and keeping quality of its dhal, popularly known as Tandur dhal. These white seeded types are low yielders and highly susceptible to *Fusarium* wilt. Hence, the entire white seeded types were replaced with high yielding and *Fusarium* wilt resistant red seeded varieties. Now there is renewed interest shown by farmers for white seeded pigeonpea varieties. Therefore the present study was taken up to quantify the genetic variation that exists for grain yield and its attributes and to explore the possibility of improving white seeded pigeonpea lines through breeding programmes.

In present investigation, fifty white seed coated lines, collected from farmers fields were evaluated in randomized block division with two replications at Agricultural Research Station, Tandur during *kharif* 2005. Each entry was sown in two rows of 3 m long, with spacing of 90 cm between the rows and 20 cm between the plants. All the management practices were followed to raise good crop. In each entry five plants were randomly selected for recording the data on twelve characters viz., days to 50% flowering, days to maturity, plant height (cm), plant spread (cm), number of primary branches per plant, number of secondary branches per plant, number of pods per plant, seed yield per plant, number of seeds per pod, pod length (cm), raceme length (cm) and 100 seed weight (g). The analysis of variance for yield and yield contributing characters was carried out as suggested by Panse and Sukhatme (1985). The genotypic and phenotypic coefficients of variation were calculated as per the formula suggested by Burton and DeVene (1953). Heritability (broad sense) as per Honson *et al.,* (1956) and genetic advance as per Johnson *et al.,* (1955) were also worked out.

Analysis of variance revealed significant differences for all the characters studied, indicating presence of significant variability among the genotypes. Range, Mean, Phenotypic Coefficients of Variation (PCV), Genotypic Coefficients of Variation (GCV), Heritability, genetic Advance and Genetic advance as per cent of mean for twelve characters presented in table 1. PCV were higher than GCV for all the traits under investigation, indicating that they all interacted with the environment with same degree. High GCV and PCV were observed for number of pods per plant, seed yield per plant, plant height and raceme length, indicating the presence of high amount of variability. These results were in conformity with that of Satish Kumar *et al.,* (2006) and Firoz mahamad *et al.,* (2006). Number of pods per plant, seed yield per plant, primary and secondary

branches per plant , plant height, raceme length, 100 seed weight, seeds per pod, pod length and plant spread had high heritability coupled with high genetic advance as per cent over mean, that might be due to the additive gene effects. Hence, selection will be very effective for these characters in pigeonpea. The earlier reports Firoz mahamad *et al.,* (2006) and Satish kumar *et al.,* (2006) are in agreement with the present results. Panse (1957) reported that the additive gene effects is responsible for the inheritance of those quantitative characters which exhibit high heritability and high genetic advance as per cent mean in broad sense and such characters could be improved by selection. High heritability and low genetic advance as per cent over mean were observed for days to 50% flowering and days to maturity, suggesting preponderance of non additive gene action in the inheritance of these traits. Satish Kumar *et al.,* (2006) reported similar results.

Therefore, it may be concluded that the characters viz., number of pods, seed yield, primary branches and secondary branches per plant, plant height and receme length which have shown high PCV, GCV, heritability, genetic advance as per cent over mean can be improved through efficient breeding programme. On the basis of these results, about ten superior lines were selected for further yield evaluation.

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Table 1: Components of genetic variability in white seed coated pigeonpea

Characters	Range of variation	General Mean	GCV	PCV	Heritability	Genetic advance	GA as % over mean
Days to 50% flowering	112.0-139.0	127.8	6.2	6.8	0.8	12.68	0.1
Days to maturity	162.0-198.0	183.7	5.5	6.3	0.77	13.41	0.07
Plant height (cm)	161.0-239.0	203.3	16.4	17.4	0.89	45.52	0.22
Plant Spread(cm)	28.0- 44.0	36.6	6.7	8.3	0.65	6.75	0.18
Primary Br. /plant	5.0- 12.2	7.85	6.6	6.8	0.94	3.68	0.47
Secondary Br. /plant	12.2- 31.1	16.6	9.3	9.6	0.95	7.64	0.46
Pod Length (cm)	3.3-6.2	4.3	1	1.1	0.91	1.28	0.3
Seeds/pod	3.0-5.3	3.8	0.6	0.5	0.84	6.76	1.78
Pods/ plant	75.0-372.0	243.4	51.4	52.3	0.97	163	0.67
Raceme length (cm)	21.0-75.0	45.2	15.9	17.3	0.85	20.3	0.45
Test Weight(g)	6.5-16.6	8.8	5.9	6.4	0.99	3.91	0.44
Seed Yield/ Plant(g)	28.0-98.0	54.5	20.3	21	0.93	29.76	0.55