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Genetic Association and Path Analyses for Yield and Yield Components in Greengram under Late Rice Fallows

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ABSTRACT

Correlation and path coefficient estimates for yield and yield components were analysed using five lines, four testers and their twenty cross combinations under late rice fallow situation. Genotypic and phenotypic correlation studies showed higher magnitude of genotypic correlations than the phenotypic correlation coefficients between the traits, indicating strong inherent association between different traits. Yield per plant was positively and significantly correlated with days to 50 % flowering, days to maturity, plant height, pods per plant, seeds per pod,100 seed weight,seed protein and shoot dry weight . The path coefficient studies revealed that shoot dry weight had maximum direct positive effect on seed yield followed by pods per plant, seeds per pod, days to maturity and 100 seed weight. The indirect effect of the characters *viz.,* shoot dry weight, pods per plant, seeds per pod and 100 seed weight were positive. Hence, while applying selection pressure emphasis should be given to shoot dry weight, pods per plant, 100 seed weight and seeds per pod in order to improve the seed yield in greengram under late rice fallow system.

Key words : Genetic Associations, Greengram, Late Rice Fallows, Path Analysis

Among several cropping systems, cultivation of greengram in rice fallows sown in the months of January/February is a common practice in Nellore district, under Pennar delta in Andhra Pradseh.

Hence, the present investigation was under taken to understand inter- relations among yield and component characters and their direct and indirect effects on yield in order to bring about improvement in yield of greengram under late rice fallow situation.

MATERIAL AND METHODS

The experimental material comprised five lines (LGG-410, LGG-460, MGG-341, PUSA-9672 and Podalkuru local) and four testers (LGG -407, WGG – 2 ,TARM – 21 and LGG – 410) Which were mated in a line X tester design to get twenty cross combinations . The crosses along with their parents were raised in randomized bolck design with three replications, during late *rabi* 1999-2000 under rice fallow at Agricultural Research Station, Nellore. The plot size comprised two rows of 4 m length by adopting an inter-and intra-row spacing of 30 X 10 cm respectively. Recommended package of practices were adopted. Observations were recorded on ten randomly selected plants for plant height, pods per plant, seeds per pod, shoot dry weigth and seed yield per plant. However, for days to 50% flowering, days to maturity, 100 seed weight, shoot nitrogen and seed protein the data were recorded on plot basis. Correlations were computed (Johnson *et.al.,* 1955) to determine the interrelationship among these characters.The direct and indirect contribution of these characters on seed yield was analyzed following path analysis as suggested by Dewey and Lu (1959) .

RESULTS AND DISCUSSION

The correlation coefficients among ten important characters, at phenotypic and genotypic levels are presented in Table 1. The data clearly showed higher magnitude of genotypic correlations than the phenotypic correlations coefficients between the traits, indicating strong inherent association between different traits. The yield was positively and significantly correlated at both genotypic and phenotypic levels with days to 50 % flowering, days to maturity, plant height, pods per plant, seeds per pod, 100 seed weight, seed protein and shoot dry weight. Similar strong positive correlations were also observed by Yaqoob *et al.,* (1997) and Naidu (1993). Hence, these traits can be considered for improvement of greengram both for yield and quality under late rice fallow situation.

The path coefficient studies revealed that (Table 2) shoot dry weight had maximum direct positive effect on seed yield followed by pods per plant, seeds per pod, days to maturity and 100 seed weight. The indirect effect of characters shoot dry weight, pods per plant, seeds per pod , 100 seed

Table 1. Genotypic (upper half) and phenotypic (lower half) correlation coefficients in parents and hybrids in greengram

Characters	Days to 50% flowering	Days to maturity	Plant height (cm)	Pods/ plant	Seeds/ pod	100 seed wt (g)	Shoot nitrogen (%)	Seed protein (%)	Shoot dry wt.	Yield/ plant (g)
Days to 50% flowering	1.000	0.793**	0.727**	0.695**	0.174	0.667**	-0.170	0.302**	0.634**	0.626**
Days to maturity	0.788**	1.000	0.462**	0.595**	0.210	0.426**	-0.075	0.151	0.590**	0.597**
Plant height (cm)	0.691**	0.437**	1.000	0.684**	0.024	0.524**	-0.296**	0.226	0.740**	0.612**
Pods/plant	0.574**	0.446**	0.586**	1.000**	0.348**	0.635**	-0.167	0.429**	0.856**	0.845**
Seeds/pod	0.160	0.186	0.026	0.292*	1.000	0.318*	0.426**	0.598**	0.442**	0.518**
100 seed weight (g)	0.606**	0.393**	0.488**	0.531**	0.307**	1.000	-0.100	0.531**	0.665**	0.691**
Shoot nitrogen (%)	-0.164	-0.062	-0.282*	-0.151	0.370**	-0.104	1.000	0.406**	-0.203	-0.177
Seed protein (%)	0.273*	0.123	0.205	0.359**	0.545**	0.494**	0.386**	1.000	0.421**	0.466**
Shoot dry weight/plant	0.592**	0.533**	0.682**	0.709**	0.351**	0.574**	-0.195	0.392**	1.000	0.919**
Yield/plant (g)	0.556**	0.512**	0.564**	0.787**	0.468**	0.626**	-0.171	0.445**	0.842**	1.000

* * = Significant at 1% level * = Significant at 5% level

Table 2. Genotypic path coefficient analysis for grain yield in F_1's and their parents, in greengram

Characters	Days to 50% flowering	Days to maturity	Plant height (cm)	Pods/ plant	Seeds/ pod	100 seed wt (g)	Shoot nitrogen (%)	Seed protein (%)	Shoot dry wt.	Correlation with yield/ plant(g)
Days to 50% flowering	-0.095	0.110	-0.035	0.150	0.033	0.091	0.023	-0.012	0.337	0.626**
Days to maturity	-0.075	0.130	-0.022	0.128	0.039	0.058	0.010	0.006	0.314	0.597**
Plant height (cm)	-0.068	0.064	-0.049	0.147	0.004	0.071	0.040	0.009	0.393	0.612**
Pods/plant	-0.065	0.083	-0.033	0.215	0.065	0.086	0.022	0.017	0.455	0.845**
Seeds/pod	-0.016	0.029	-0.001	0.075	0.186	0.043	-0.058	0.024	0.235	0.518**
100 seed weight (g)	-0.063	0.509	-0.025	0.137	0.059	0.136	0.013	0.021	0.354	0.691**
Shoot nitrogen (%)	0.016	-0.010	0.014	-0.036	0.079	-0.014	-0.135	0.016	-0.018	-0.177
Seed protein (%)	-0.028	0.021	-0.011	0.092	0.111	0.072	-0.055	0.040	0.224	0.466**
Shoot dry weight/plant	-0.060	0.082	-0.036	0.184	0.082	0.090	0.027	0.017	0.532	0.919**

Residual effect= 0.4431 ** = Significance at 0.01 level of probability

weight were positive . Therefore, emphasis should be given to shoot dry weight , pods per plant, seeds per pod,100 seed weight while making selections to improve the seed yield in greengram under late rice fallow system. Genotypes with more shoot dry weight may establish quickly and cover the gaps under rice fallows.This may suppress the weeds and conserve moisture as well. Hence, selection based on the shoot dry weight might result with a high yielding genotype suitable for late rice fallow system. However, though days to flowering had positive correlation with yield, it had negative direct effect which could be better exploited for the devolpment of early duration types.

Mungbean genotypes having higher shoot dry weight, pods per plant, seeds per pod and 100 seed weight should be selected for the improvement of yield under late rice fallows of Pennar delta in Andhra Pradesh.

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