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CORRELATION AND PATH ANALYSIS FOR FODDER ATTRIBUTES IN COWPEA

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ABSTRACT

To assess the associations between green fodder yield and its components and to trace out the direct and indirect effects of characters on green fodder yield, correlation studies and path analysis were conducted in 59 genotypes of fodder cowpea. Correlation studies revealed that green fodder yield was significant and positively associated with leaf area index, specific leaf weight, number of branches, dry matter yield, leaf stem ratio and crude protein content. The path analysis revealed the maximum direct effects of dry matter yield and leaf area index on green fodder yield.

KEY WORDS : Cowpea, Correlation, Path Analysis, Green Fodder Yield.

In summer, livestocks need adequate nutritious green fodder. Introduction of fodder legumes in crop rotation and intercropping, revegetating waste lands, common grazing lands and natural range lands through reseeding with legumes will solve the above problems (Vijendra Das, 1992). Among the legumes, cowpea is amenable to be grown either as a pure or intercrop. Therefore, identification of elite genotypes and utilising them in cowpea improvement is an important step. This requires a thorough knowledge on genetics of yield components and their interrelationships. An understanding of physiology of growth and sink parameters contributing to yield helps in raising the productivity of cowpea. So, an attempt was made in the present investigation to assess the correlations among the green fodder yield components and the direct and indirect effects.

MATERIALS AND METHODS

Materials consisted of 14 lines (ovule parents) and 3 testers (pollen parents) and their 42 hybrids. These 59 genotypes were raised in a randomised block design, replicated thrice. Each genotype was raised in three rows of four m in length adopting a spacing of 45 x 20 cm. Leaving two border rows, the middle one was taken for nine biometric observations such as days to flowering, plant height, leaf area index, specific leaf weight, number of branches, dry matter yield, leaf stem ratio, crude protein content and green fodder yield. Genotypic correlation coefficients (Singh and Chaudhary 1985) and path analysis (Dewey and Lu 1959) were computed.

RESULTS AND DISCUSSION

Estimates of genotypic correlations in the present study indicated that all the green fodder yield components had positive correlations with yield (Table 1). Positive correlation between days to flowering and green fodder yield was reported by Akundabweni *et al.* (1990). Roquib and Patnaik (1989) reported the positive association between green fodder yield and leaf area index and leaf stem ratio. Significant positive relationships between green fodder yield and plant height, specific leaf

Table 1. Genotypic correlation coefficients between green fodder yield and its component traits.

Character	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
Days to flowering (X_1)	0.138	0.045	0.037	0.299*	0.064	0.387**	0.254	0.062
Plant height (X_2)	1.000	0.148	0.040	0.058	0.147	0.195	0.073	0.149
Leaf area index (X_3)		1.000	0.248	0.328*	0.993**	0.419**	0.349**	0.995**
Specific leaf weight (X_4)			1.000	0.545**	0.291*	0.175	0.025	0.282*
Number of branches (X_5)				1.000	0.377**	0.278*	-0.192	0.370**
Drymatter yield (X_6)					1.000	0.424**	0.347**	0.999**
Leaf stem ratio (X_7)						1.000	0.454**	0.426**
Crude protein content (X_8)							1.000	0.349**
Green fodder yield (X_9)								1.000

* Significant at 5 per cent level ** Significant at 1 per cent level.

Table 2. Direct and indirect effects of different traits on cowpea green fodder yield

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	Genotypic correlation coefficients
X_1	0.0025	0.0001	0.0059	-0.0002	0.0004	0.0556	0.0031	-0.0003	0.0624
X_2	-0.0004	0.0006	0.0194	0.0003	0.0001	0.1276	0.0016	-0.0001	0.1491
X_3	-0.0001	0.0001	0.1308	-0.0012	0.0004	0.8621	0.0033	-0.0004	0.9950**
X_4	-0.0001	0	0.0325	0.0050	0.0007	0.2426	0.0014	0	0.2821*
X_5	-0.0008	0	0.0429	-0.0027	0.0012	0.3273	0.0022	-0.0002	0.3700**
X_6	-0.0002	0.0001	0.1299	-0.0015	0.0005	0.8681	0.0034	-0.0004	0.9990**
X_7	-0.0010	0.0001	0.0548	-0.0009	0.0003	0.3651	0.0080	-0.0005	0.4259**
X_8	-0.0006	0	0.0457	-0.0001	0.0002	0.3012	0.0036	-0.0010	0.349**

X_1 - Days to flowering
X_2 - Plant height
X_3 - Leaf area index
X_4 - Specific leaf weight
X_5 - Number of branches
X_6 - Dry matter yield
X_7 - Leaf stem ratio
X_8 - Crude protein content
R - 0.0185; R^2 - 0.9997

* Significant at 5 per cent level
** Significant at 1 per cent leven
Underlined figures show the direct effects.

weight and number of branches were reported by Thaware *et al.* (1992). Mittal and Sohoo (1991) reported the positive relationship between green fodder yield and dry matter yield.

Positive relationships between days to flowering and plant height and leaf area index, number of branches, drymatter yield and crude protein content were observed (Table 1). Similar reports were given by Patil and Bhapkar (1987) and Biradar *et al.* (1991). Positive correlations between plant height and leaf area index, specific leaf weight, number of branches, drymatter yield, leaf stem ratio and crude protein content were observed. These results were similar to the results of Thaware *et al.* (1992), Mittal and Sohoo (1991) and Biradar *et al.* (1991). Significant positive relationships between leaf area index and number of branches and crude protein content were also observed. Similar results were observed by Rang and Uppal (1986). Specific leaf weight had positive relationship with number of branches, drymatter yield and leaf stem ratio. Similar results were also obtained by Thaware *et al.* (1992) and Jatasra and Dahiya (1988). Positive relationship between number of branches and drymatter yield also was reported by Mittal and Sohoo (1991). Negative relationship between number of branches and crude protein content was also observed by Biradar *et al.* (1991). Dry matter yield had positive relationship with crude protein content, as observed by Vijay Pal (1989).

In the present study, all the component characters except crude protein content recorded positive direct effects on green fodder yield (Table 2). Similar results were observed by Kumar *et al.* (1983) and Akundabweni *et al.* (1990). Through plant height, leaf area index, number of branches, leaf stem ratio and drymatter yield, days to flowering recorded positive indirect effects on green fodder yield. Similar results were also reported by Akundabweni *et al.* (1990). Negative indirect effect through crude protein content was also reported in field peas by Jermyn and Slinkard (1976). Positive indirect effects of plant height on green fodder yield through leaf area index, specific leaf weight and number of branches in the present study were in agreement with the findings of Jatasra and Dahiya (1988). Leaf area index had high positive indirect effect through drymatter yield on green fodder yield. Similar results were obtained by Radha Manoharan (1978).

From the study, it was obvious that the highest positive direct effects on green fodder yield were achieved by leaf area index and drymatter yield. Moreover, the indirect effects of other traits through leaf area index and drymatter yield were also positive. These facts suggested that the traits leaf area index and drymatter yield are more reliable for selection in cowpea for green fodder yield.

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COMBINING ABILITY OF NEW MALE STERILE LINES OF DIVERSE SOURCES IN PEARL MILLET FOR YIELD AND YIELD COMPONENTS

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ABSTRACT

Nine male sterile lines of pear milet and six inbreds were evaluated for their combining ability in a line x tester mating design. The GCA and SCA variance focussed the importance of non-additive effects for days to 50 per cent flowering, panicle girth and grain yield per plant indicating heterosis breeding for yield improvement. For plant height and humber of productive tillers, both the components were almost equal. Among lines, 834A and Pb405A were good combiner for yield and 338A and Pb302A for early flowering. The testers PIB 223IP, PT 1921 and K560-230 were good combiner for grain yield per plant. The hybrid 834AxPIB 2231P showing highest mean expression and *sca* effect for grain yield offered scope for exploitation of heterosis.

KEY WORDS : Combining Ability, Pearl Millet, Male Sterile Lines.

In pearl millet *Pennisetum glaucum*(L.) R.Br.) there is a need to study the combining ability of parental lines for identifying prepostent parents and potential hybrids since the development of hybrids possessing high yield is being felt owing to the manifestation of heterosis for yield. The present study was undertaken to assess the combining ability of nine male sterile lines of diverse sources and six inbred lines for yield components in pearl millet.

MATERIALS AND METHODS

Six inbred lines of pearl millet derived from diverse sources were crossed with nine new male sterile lines *viz.*, 81A, 834A, 3383A, Pb302A, Pb305A, Pb403A, Pb405A, PT732A and ms1A representing different cytoplasmic bases. The resulting F1 hybrids were grown at Regional Research Station, Virdhachalam, TamilNadu is a randomised block design with three replications during *kharif* 1987, in single row of three m length