

PATH ANALYSIS IN GUINEA GRASS (*PAN/CUM MAX/MUM JACQ.*)

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Guinea grass, a native of tropical Africa, is the most important and popular fodder grass grown in Kerala. Genetic investigations on this crop are very meagre. In any crop improvement programme for high yield and quality, information on the nature and magnitude of variation existing in the available genotypes, association of characters with yield and among themselves and the extent of environmental influence on these characters is a pre-requisite.

The present study was thus carried out to partition the genetic association into direct and indirect effects on yield and also to find out the real contribution of each component character to green fodder yield by adopting path analysis.

Materials and Methods

Twenty four diverse varieties of guinea grass were used in the present study. The experiment was laid out in randomised block design with three replications. Fifty slips were planted in each plot in five rows of ten plants each. Observations were made on nine morphological characters and four chemical attributes. The data collected were subjected to correlation analysis. Five morphological characters (days to 50 per cent flowering, plant height, number of tillers, girth of internode and length of panicle) possessing highly significant genotypic correlation with green fodder yield were considered for path analysis as suggested by Wright (1923).

Results and Discussion

Results on path coefficient analysis along with direct and indirect effects of the different characters on fodder yield are given in Table 1 and Fig 1.

Out of the five component characters analysed, plant height exhibited the the maximum positive significant correlation with fodder yield (0.9373). This effect was seen to be due to the total effect of its direct contribution and its indirect effect through girth of internode. The maximum contribution to green fodder yield was through plant height, since it recorded maximum positive direct effect (3.7924). This relation is in conformity with the findings of several workers including Bohra *et al.* (1959) and Ramaswami (1974) in *Cenchrus ciliaris*, Naphude (1972) and Patel *et al.* (1973) in forage sorghum and Dhumale and Mishra (1978) in fodder oats. The plant height also showed positive indirect effect via girth of internode (2.3937). All other indirect effects were negative. The maximum indirect effect was through days to 50 per cent flowering (—3.5605), followed by length of panicle (—0.9317) and number of tillers (-0.7566) per plant. The correlation of number

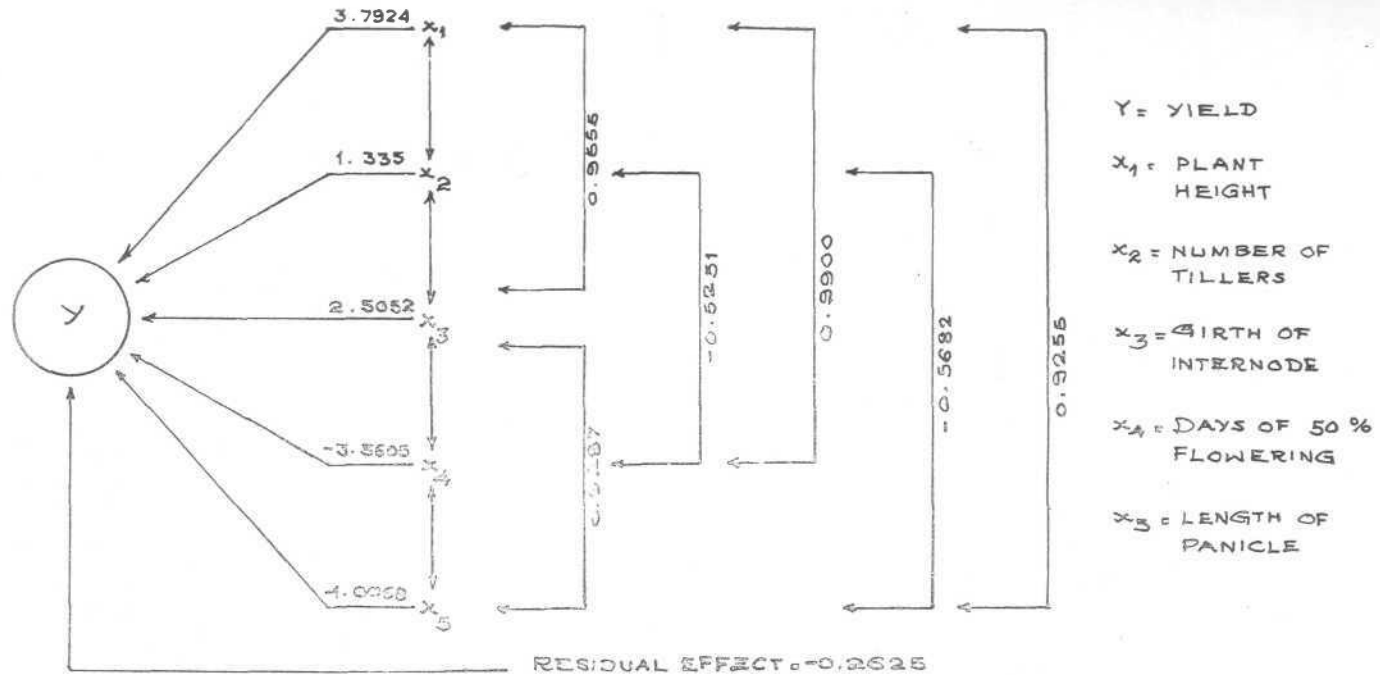


Fig 1. Path diagram showing the direct effects and inter-relationships between green fodder yield and five selected yield components

of tillers on green fodder was negative (-0.3585) though its direct effect was positive (1.3335). Reports of Dhanakodi (1980) was also in agreement with the above findings. The negative correlation may be due to the negative indirect effects through plant height and girth of internode. Plant height and number of tillers were negatively associated, which indicated that taller varieties have lower number of tillers. The number of tillers had positive indirect effect on yield through days to 50 per cent flowering (1.8696) and length of panicle (0.5721) and negative indirect effects through plant height (-2.1518) and girth of internode (-1.9819).

Another character which had strong positive correlation with fodder yield was girth of internode (0.8846). It showed direct positive effect on fodder yield (2.5052) as reported by Ramaswami (1974), Nephude (1972) and Paroda *et al.* (1975). Patel *et al.* (1973) reported a positive direct effect of diameter of the culm on fodder yield in fodder sorghum. The indirect effect of girth of internode on fodder yield was only through plant height and was positive (3.6236). It had maximum negative indirect effect through days to 50 per cent flowering (-3.2543) followed by number of tillers (-1.0549) and length of panicle (-0.9350).

Days to 50 per cent flowering also had significant and strong positive correlation with fodder yield (0.9282). However, its direct effect on yield was negative (-3.5605). This may be due to its high negative indirect effect through number of tillers and length of panicle. Therefore the influence of number of tillers can be taken to be more reliable than that of length of panicle. Days to 50 per cent flowering exhibited maximum positive indirect effect through plant height (3.7924), followed by girth of internode (2.2897). It also had negative indirect effects through length of panicle (0.8932) and number of tillers (-0.7002).

Eventhough, length of panicle showed high positive correlation with fodder yield, its direct effect on yield was negative. The correlation coefficient was 0.9127 and the direct effect was -1.0068 . Its indirect effect on yield was positive and maximum through plant height (3.5095) followed by girth of internode (2.3266). It also had negative direct effect via days to 50 per cent flowering (-3.1589) and number of tillers (-0.7577).

In the present investigation, it has thus been indicated that plant height is the decisive factor affecting the yield of the fodder. And hence, selection of tall fodder grasses gives a positive response to selection for further improvement in fodder yield.

Summary

Twenty four diverse genotypes of guinea grass were assessed to test the path coefficient relation to fix the characters having maximum influence on fodder yield. Path analysis revealed that the maximum direct contribution to fodder yield was through plant height followed by girth of internode. Number of days to 50 per cent flowering, girth of internode and length of panicle also showed indirect contributions towards higher yield. It was also clear from the present investigation that a positive selection can be achieved based on plant height and culm thickness in this fodder crop.

Table 1

Path coefficients of genotypic effects of various yield components on green fodder yield

Sl. No.	Characters	Direct effect	Indirect effects				Total correlation	
			Plant height (cm)	Number of tillers	Girth of internodes	Days to 50% flowering		Length of panicle (cm)
1	Plant height (cm)	3.7924	—	-0.7566	2.3937	-3.5605	-0.9317	0.9373
2	Number of tillers	1.3335	-2.1518	—	-1.9819	1.8696	0.5721	-0.3585
3	Girth of internode (cm)	2.5052	3.6236	-1.0549	—	-3.2543	-0.9350	0.8846
4	Days to 50% flowering	-3.5605	3.7924	-0.7002	2.2897	—	-0.8932	0.9282
5	Length of panicles (cm)	-1.0068	3.5095	-0.7577	2.3266	-3.1589	—	0.9127

Residual effect = -0.2625

സംഗ്രഹം

കാലിത്തീറ്റയുൽപ്പാദനത്തെ പരമാവധി സ്വാധീനിക്കുന്ന സ്വഭാവങ്ങളുടെ പഥ ഗുണക ബന്ധം നിശ്ചയിക്കാൻ വേണ്ടി 24 വ്യത്യസ്ത ഗിനിപ്പുൽ ജീനരൂപങ്ങളെ വിലയിരുത്തുകയുണ്ടായി. പുള്ളിന്റെ ഉൽപ്പാദനത്തെ നേരിട്ട് സ്വാധീനിക്കുന്ന മുഖ്യഘടകങ്ങൾ ചെടിയുടെ ഉയരവും തണ്ടിന്റെ ഘനവുമാണെന്നു മനസ്സിലായി.

Acknowledgement

This forms a part of the M.Sc. (Ag) thesis of the senior author submitted to the Kerala Agricultural University. The senior author is indebted to the Indian Council of Agricultural Research, New Delhi, for the award of a junior research fellowship.

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