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ASSOCIATION OF YIELD COMPONENTS IN FORAGE MAIZE (*Zea mays* L.) INBREDS

M. PARMATHMA,¹ C. SURENDREN² and C.V. DHANAKODI³

ABSTRACT

Correlation co-efficient and path co-efficient analysis were computed for yield components of Forage maize. The results revealed that the association of plant height, stem girth, leaf breadth and leaf number with fodder yield was high and positive. path co-efficient analysis indicated that plant height had the maximum direct effect followed by leaf breadth and stem girth. Hence, these three characters should be given importance while breeding for high forage production in maize.

There are limited reports on correlation and path analysis of important fodder traits in forage maize and the knowledge on which is important for initiating any plant improvement programme. The present investigation was, therefore, undertaken to study the extent of association and the magnitude of direct and indirect effect of various yield components on green fodder yield in maize.

MATERIALS AND METHODS

The present investigation was conducted at Tamil Nadu Agricultural University Farm, Coimbatore, in RBD with three replications. The experimental materials consisted of 60 inbred lines. Each inbred was raised in a single row adopting a spacing of 50cm x 20cm. The observations were recorded on five randomly selected plants for plant height, stem girth, leaf number, leaf length, leaf

breadth, leaf/stem ratio, days to silking and fodder yield.

RESULTS AND DISCUSSION

All the seven characters showed positive association with fodder yield (Table 1). Among the characters studied, plant height, leaf breadth, stem girth and leaf number exhibited significant association with green fodder. While the association of leaf/stem ratio days to silking and leaf length with green fodder yield was low and insignificant. Similar trend of relationship was reported by Strobe (1967) and Cortez et al. (1969) in forage maize. These traits, namely, plant height, stem girth, leaf number and leaf breadth could serve as good selection indices in breeding for forage maize.

Inter-correlations among plant height, stem girth, leaf number leaf breadth and days to silking were sig-

1 Assistant Professor, Agrl. College, Killikulam

2 Professor and Head, Forestry Research Station Mettupalayam

3 Associate Professor Agrl. College, Killikulam

nificant and positive. This indicated the possibility of effecting simultaneous improvement in these characters by a single selection. The reports of Jhorar and Paroda (1976) in forage sorghum agreed with these findings. The association of leaf/stem ratio with leaf number and leaf breadth, and that of leaf number with leaf length, was negative but non-significant. Rana *et al* (1976) obtained similar negative and non-significant association of leaf number with leaf length and leaf width in fodder sorghum. According to Adams (1967) such negative correlations could be expected from developmentally induced relationships between any two developing components which compete for a common nutrient and water supply. Consequently a negative correlation results when one of the components is favoured over other in the amount of nutrient received. Perhaps, a similar phenomenon might have been operative among leaf and stem development in the present study, causing negative correlation between them. Since These traits had positive association with fodder yield, there is a need for judicious care while using them as selection indices.

The path-co-efficient analysis revealing the cause and effect of different yield components would provide a better

index for selection rather than mere correlation co-efficient. Plant height had the maximum direct effect on fodder yield followed by leaf breadth and stem girth (Table 2) These results were in agreement with Jhorar and Paroda (1976) in forage sorghum. Low magnitude of direct effects was observed for other characters.

Maximum positive indirect effect for plant height on fodder yield was observed viz., leaf breadth followed by stem girth. The stem girth exhibited larger indirect effect through plant height and leaf breadth. The leaf number also contributed to the fodder yield mainly through plant height. However, the high values of residual path ways indicated that the characters included in the present study appears to be inadequate to satisfy their contribution to fodder yield.

From the path analysis studies, it may be concluded that, maximum direct effects were exhibited by plant height followed by leaf breadth and stem girth. Incidentally, all these three traits exhibited positive and significant correlation with fodder yield and hence were considered to be the most important yield contributing characters. Therefore due emphasis should be placed on these characters while selection of inbreds for high yield in forage maize.

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TABLE 1 : Simple Correlation co-efficient of Yield Components in Forage Maize inbreds

Characters	Stem girth	Leaf number	Leaf length	Leaf breadth	Leaf/stem ratio	Days to silking	Fodder yield
Plant height	0.522639**	0.468874**	0.290712**	0.32771**	0.038854	0.467884**	0.768196**
Stem girth		0.473309**	0.05099	0.552098**	0.048398	0.587993**	0.665192**
Leaf Number			-0.134736	0.329212**	-0.022792	0.641557**	0.390361**
Leaf Length				0.113188	0.156193	-0.159061	0.149502
Leaf breadth					-0.026043	0.215316*	0.687881**
Leaf/stem ratio						-0.035826	0.097235
Days to silking							0.332552

* Significant at 5% level

** Significant at 1% level

TABLE 2 : Path co-efficient analysis showing Direct effects (underlined> and Indirect Effects of Yield Components on Fodder Yield in Forage Maize inbreds.

Characters	Direct and indirect effects through							Total correlation with fodder yield
	plant height	stem girth	Leaf number	Leaf length	Leaf breadth	Leaf/stem ratio	Days to silking	
Plant height	0.674154	0.115444	-0.35909	0.046128	0.140526	0.003420	-0.083312	0.768196
Stem girth	0.352339	0.220888	-0.036248	-0.008091	0.236743	0.004260	-0.104698	0.66192
Leaf number	0.316093	0.104548	-0.076585	0.021379	0.141168	-0.002006	-0.114236	0.390361
Leaf Length	0.195985	0.011263	0.010319	-0.158673	0.048536	0.013748	0.028323	0.149502
Leaf Breadth	0.220930	0.115325	0.115325	-0.025213	-0.017960	0.428806	-0.002292	-0.038339
Leaf/stem ratio	0.026194	0.010691	0.001746	-0.024784	-0.011162	0.088022	0.006379	0.097235
Days to silking	0.315426	0.129880	-0.49134	0.023953	0.092329	-0.003513	-0.178061	0.332552

Residual factor 0.380119

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RADIATION INDUCED MUTATIONS IN CHINESE POTATO

K. VASUDEVAN and J.S. JOS

ABSTRACT

Effects and efficiency of gamma ray treatments on induced variability for yield contributing traits were studied in Chinese potato (*Coleus parviflorus* Benth), in which lack of morphological variability has been observed in the germplasm collection made so far. Underground tubers weighing 1.5 g/tuber of accession number CP 11 were treatment with 1 kR, 2 kR, 3 kR and 4 kR gamma rays. Besides tubers weighing 3 g and 6g/tuber were also treated with 3 kR gamma rays. The study indicated that the growth reduction in MV1 generation was linear, with increasing dose of gamma rays and the 50% growth reduction (LD50) dose observed was with 3 kR gamma ray treatment. From the study more than 50 different morphological solid mutants were obtained representing variability for plant structure (new ideotype), leaf size and shape, flowering and tuber characters.

Chinese potato (*Coleus parviflorus* Benth), a starchy aromatic tuber crop, is widely cultivated in South India, Sri Lanka, Indonesia and parts of Tropical Africa. It is reported as an amphidiploid in origin and contains 68 (2n) chromosomes (Ramachandran, 1968).

Germplasm resources indicate that the genetic variability for yield and yield contributing traits in the crop is very meager. Moreover, there is no seed production in the crop, though there is plenty of flower formation. Published reports towards the use of induced