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Correlation studies for Grain Yield and Yield attributes in Maize (*Zea mays* L.)

D. Nagarajan[1] and G. Nallathambi [2]
1. Department of Millets, Centre for Plant Breeding and Genetics, TNAU, Coimbatore.
2. Department of Millets, Centre for Plant Breeding and Genetics, TNAU, Coimbatore.
Email for correspondence: nagarajanpbg@gmail.com

ABSTRACT
Selection of best hybrids in maize increased the production and productivity. However, selection on the basis of grain yield alone is usually not effective, because grain yield is a complex trait that depends on a number of yield attributes. Therefore, 69 F_1 hybrids obtained by crossing twenty three lines and three testers in a line × tester fashion were used to derive the information on degree of relationship between yield and yield attributes in maize. Sixty nine crosses and their parents including one check CoH(M)5 were evaluated in a Randomized Block Design with two replications. Among the various characters studied, cob length (0.794), hundred grain weight (0.762), cob diameter (0.751), number of kernels per row (0.704), number of leaves above the cob (0.555), plant height (0.529), shelling percentage (0.506), number of kernel rows per cob (0.428), fodder yield per plant (0.323), ear height (0.284), and days to maturity (0.008), showed significant positive association with grain yield per plant. Days to 50 per cent tasseling (-0.060), and days to 50 per cent silking (-0.086) showed significant negative association with grain yield per plant.
Keywords: *Correlation, Line × Tester Analysis, Zea mays L.*

INTRODUCTION
Maize (*Zea mays* L.) occupies a prominent position in global agriculture and is an important cereal crop of India. Grain yield in maize is a complex character controlled by many factors. Selection for desirable genotypes should be based on grain yield and also other yield attributes which influence the grain yield. In order to develop promising genotypes with high yield it is essential to know the associations among different traits especially with grain yield. The correlation analysis is usually taken up to measure the relative magnitude of influence of each of this independent variable on a dependent variable like grain yield. The appropriate knowledge of such interrelations between grain yield and its contributing traits can significantly improve the efficiency of breeding programs through the use of appropriate selection indices [1]. The present investigation was therefore planned to estimate the degree of association among grain yield and yield attributes in 69 F_1s along with 26 inbred parents of maize for 14 characters.

MATERIAL AND METHODS
Twenty three inbred lines and three inbred testers maintained in Maize Breeding Unit, Department of Millets, Tamil Nadu Agricultural University were used for this study. Using 26 inbred parents, 69 hybrid combinations were obtained by crossing them in a Line x Tester design during *Kharif*, 2011. All the cross combinations were raised along with their parents in four meter row with spacing of 60 × 25 cm in Randomized Block Design (RBD) with two replications, at Department of Millets, Centre for Plant Breeding and Genetics, TNAU, Coimbatore, during *Rabi*, 2011-12. Recommended cultural practices were adopted to raise good crop.
Five plants were randomly selected in hybrids and their parents in each replication and observations were recorded for days to 50 per cent tasseling, days to 50 per cent silking, days to maturity, plant height (cm), ear height (cm), number of leaves above the cob, cob length (cm), cob diameter (cm), number of kernel rows per cob, number of kernels per row, shelling percentage, 100- grain weight (g), fodder yield per plant (g) and grain yield per plant (g). The mean values of five plants were utilized for estimation of

genotypic correlation co-efficient as per the method suggested by Johnson *et al*. [2] to find out the relationship between grain yield and yield attributes.

RESULTS AND DISCUSSION

The genotypic correlation coefficients estimated between grain yield and its attributes and inter-correlations among the different yield attributes are furnished in Table 1.

Among the various characters studied, cob length (0.794), hundred grain weight (0.762), cob diameter (0.751), number of kernels per row (0.704), number of leaves above the cob (0.555), plant height (0.529), shelling percentage (0.506), number of kernel rows per cob (0.428), fodder yield per plant (0.323), ear height (0.284), and days to maturity (0.008), showed significant positive association with grain yield per plant. Days to 50 per cent tasseling (-0.060), and days to 50 per cent silking (-0.086) showed significant negative association with grain yield per plant.

Plant height was positively and significantly associated with grain yield per plant. The association of plant height with all other traits was positive and significant. Similar results were also reported by Rahman *et al*. [3]. Ear height was positively and significantly associated with shelling percentage and fodder yield per plant. This was confirmed with the result of Vaghela *et al.* [4]. The association of ear height with all other traits was positive and non significant except number of kernel rows per cob. The number of leaves above the cob was associated positively and significant with grain yield per plant. The association between number of leaves per plant and all other traits were positive and significant.

Cob length was positively correlated with grain yield per plant. This result was in confirmation with the findings of Rafiq *et al.* [5] and Vijay Kumar *et al.* [10]. It exhibited positive and significant association with number of leaves above the cob, plant height, cob diameter, number of kernels per row and 100 grain weight. Cob diameter was positive and significantly correlated with all other traits except days to 50 per cent silking. Similar results were reported by Kashiani *et al.* [6] and Khayatnezhad *et al.* [7].

Number of kernel rows per cob was positively and significantly associated with grain yield per plant. Similar findings were observed by Beiragi *et al.* [8] and Vijay Kumar *et al.* [10]. It was positive and significantly correlated with cob diameter and number of leaves above the cob. Number of kernels per row was positively and significantly associated with grain yield. Similar findings were observed by Khayatnezhad *et al.* [7]. It had positive and significant association with plant height, ear height, shelling percentage and hundred grain weight.

Shelling percentage was positively correlated with grain yield per plant. This result was in confirmation with the findings of Saleh *et al.,* [9]. It showed positive and significant association with plant height, ear height, numberof kernels per row and hundred grain weight. Hundred grain weight was positively correlated with grain yield per plant. This result was in confirmation with the findings of Vijay Kumar *et al*. [10]. It exhibited positive and significant association with plant height, number of leaves above the cob, cob length, cob diameter, number of kernels per row, shelling percentage and fodder yield per plant.

Fodder yield per plant was positively correlated with grain yield per plant. This result was in confirmation with the findings of Vaghela *et al.* [4]. It exhibited positive and significant association with days to maturity, plant height, ear height, number of leaves above the cob, cob diameter and hundred grain weight.

Critical analysis of results obtained from character association indicated that grain yield per plant had the highest positive and significant association with cob length followed by hundred grain weight, cob diameter, number of kernels per row, number of leaves above the cob, plant height, shelling percentage, number of kernel rows per cob, fodder yield per plant, ear height, and days to maturity. Hence selection for these traits could bring improvement in yield and yield attributes in maize.

Table 1. Genotypic correlation coefficient among yield and yield attributing traits

	Days to 50% tasseling	Days to 50% silking	Days to maturity	Plant height (cm)	Ear height (cm)	Leaves above cob	Cob length (cm)	Cob diameter	Kernel rows per cob	kernels per row
Days to 50% tasseling	1.000									
Days to 50% silking	0.95**	1.000								
Days to maturity	0.509**	0.535**	1.000							
Plant height (cm)	0.037	0.051	0.134	1.000						
Ear height (cm)	0.163	0.146	0.089	0.725**	1.000					
Leaves above the cob	0.126	0.131	0.243*	0.494**	0.090	1.000				
Cob length (cm)	-0.053	-0.081	0.086	0.452**	0.203	0.410**	1.000			
Cob diameter (cm)	0.061	-0.011	0.111	0.411**	0.086	0.594**	0.732**	1.000		
Kernel rows per cob	0.053	-0.037	-0.051	0.101	-0.032	0.352**	0.221	0.424**	1.000	
kernels per row	-0.230	-0.131	0.060	0.416**	0.230	0.413**	0.711**	0.471**	0.004	1.000
Shelling percentage	-0.137	-0.153	-0.356**	0.306*	0.285*	0.026	0.223	0.177	0.206	0.264*
Hundred grain weight	-0.135	-0.155	0.054	0.474**	0.183	0.480**	0.688**	0.599**	0.172	0.493**
Fodder yield /plant	0.032	0.072	0.247*	0.348**	0.261*	0.275*	0.220	0.273*	0.130	0.163

	Shelling percentage	100 grain weight	Fodder yield /plant	Grain yield /plant
				-0.060
				-0.086
				0.008
				0.529**
				0.284*
				0.555**
				0.794**
				0.751**
				0.428**
				0.704**
1.000				0.506**
0.370**	1.000			0.762**
0.090	0.405**	1.000		0.323**

*- Significant at 5% level **- Significant at 1% level

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