

Table 4. Anova table for efficacy test of 'Disfect-S' as surface sterilant against *Nosema bombycis* contaminated silkworm eggs on hatchability.

Source of variation	DF	Mean sum of squares Hatching
Exposure	4	22467.32**
Concentration	4	12855.24**
Replication	3	10.20
Exposure x Concentration	16	1960.30**
Residual	48	1746.12

** Significant at $P \leq 0.01$.

results obtained in the present investigation may be therefore relevant and the compound 'Disfect-S' can be a potential commercial disinfectant in the field of sericulture.

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CORRELATION AND PATH ANALYSIS IN PEARL MILLET (*Pennisetum glaucum*)

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ABSTRACT

Genotypic and phenotypic correlations were computed in a collection of twelve diverse male sterile lines, five restorers and the resulting sixty hybrids of pearl millet (*Pennisetum glaucum*(L.) R. Br.). Grain yield per plant showed high positive and significant correlation with plant height, ear length, ear girth and total number of tillers. The path coefficient analysis indicated the highest positive direct effect on grain yield per plant was exhibited by number of productive tillers followed by ear girth. Plant height, ear length and 1000 grain weight and positive indirect effects through ear girth and the total number of tillers had indirect effect through the number of productive tillers on grain yield.

KEY WORDS: Pearl Millet, Correlation, Path analysis

Yield is a complex dependent character. It depends upon a number of independent component characters which may contribute directly or indirectly. The knowledge on correlation helps in determining the component characters of complex entity whereas, the path coefficient analysis provides an effective means of partitioning direct

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and indirect causes of association. It permits a critical look to recognise the special forces acting to produce a given correlation and its relative importance. Hence a study was undertaken in pearl millet parents and hybrids to study the correlation and path analysis among the grain yield and its components.

Table 1. Genotypic and phenotypic correlation coefficients among different pairs of characters

		Plant height	Ear length	Ear girth	Total No. of tillers	No. of productive tillers	Days to maturity	100 grain weight
Grain yield per plant	rg	0.67**	0.51**	0.60**	0.32**	0.29*	0.20	0.25*
	rp	0.66**	0.49**	0.55**	0.30**	0.27*	0.19	0.25*
Plant height	rg		0.45**	0.45**	0.19	0.14	0.10	0.16
	rp		0.44**	0.42**	0.17	0.13	0.09	0.15
Ear length	rg			0.16	0.07	-0.04	0.31**	0.13
	rp			0.15	0.07	-0.03	0.29*	0.12
Ear girth	rg				-0.06	-0.13	0.14	0.47**
	rp				-0.04	-0.10	0.13	0.42**
Total No. of tillers	rg					0.94**	0.01	-0.11
	rp					0.83**	0.02	-0.10
Number of Productive tillers	rg						-0.07	-0.06
	rp						-0.06	-0.05
Days to maturity	rg							-0.38**
	rp							-0.35**

* Significant at P = 0.05

** Significant at P = 0.01

MATERIALS AND METHODS

Twelve male sterile lines and five restorers of diverse origin, their resultant sixty hybrids were raised in a randomised block design with two replications at the Millet Breeding Station, Tamil Nadu Agricultural University, Coimbatore. The plants were raised with a spacing of 45 cm between the rows and 15 cm within the rows. Observations were recorded individually on five random plants under each replication. The genotypic and phenotypic correlations (Johnson *et al.*, 1955) and path coefficients (Dewey and Lu, 1959) were worked out.

RESULTS AND DISCUSSION

In general, the genotypic correlation coefficients were higher than the phenotypic correlations in all the cases (Table 1.). These results

are in accordance with the findings of Mukherji *et al.* (1982) and Rao *et al.* (1987).

Plant height, ear length, ear girth and total number of tillers showed highly significant and positive association with grain yield per plant at both phenotypic and genotypic levels. Number of productive tillers and 1000 grain weight also showed significant correlation with grain yield per plant. The days to maturity had no association with grain yield per plant. Rao *et al.* (1987) observed that the grain yield was negatively correlated with days to flowering.

Among intercorrelations, plant height correlated positively and significantly with ear length and ear girth while ear girth significantly correlated with 1000 grain weight and the total number of tillers associated with number of

Table 2. Direct and indirect effects of different characters with yield.

	Plant height	Ear length	Ear girth	Total no. of tillers	No. of productive tillers	Days to maturity	1000 grain weight	Genotypic correlation co-efficient
Plant height	0.26	0.16	0.23	-0.05	0.08	0.00	-0.01	0.67**
Ear length	0.12	0.35	0.08	-0.02	-0.02	0.00	-0.01	0.51**
Ear girth	0.12	0.06	0.51	0.02	-0.07	0.00	-0.03	0.60**
Total number of tillers	0.05	0.03	-0.03	-0.25	0.52	0.00	0.01	0.32**
Number of productive tillers	0.04	-0.01	-0.06	-0.23	0.55	0.00	0.00	0.29*
Days to maturity	0.03	0.11	0.07	0.00	-0.04	0.01	0.02	0.20
1000 grain weight	0.04	0.05	0.24	0.03	-0.03	0.00	-0.01	0.25*

Significant at P = 0.05

Significant at P** = 0.01

productive tillers. It is concluded that selection based on plant height, ear length, ear girth and total number of tillers either individually or in combination results in high yielding lines.

Path values based on genotypic correlation coefficients showing direct and indirect effects on grain yield is given in Table 2. Results revealed that the direct contribution of number of productive tillers was positive and the highest on grain yield per plant. Ear girth, ear length and plant height which had significant association with grain yield found to have direct contribution to the grain yield. Reddy and Sharma (1982) observed, plant height had high positive direct effect on grain yield, whereas, direct effects were either low or negative for tillers per plant and ear length. Rao *et al.* (1987) showed, plant height and number of tillers had positive direct effects on grain yield.

A very high negative contribution was exhibited by total number of tillers but its indirect contribution was exerted through number of productive tillers on grain yield per plant. A very low negative contribution was given by 1000 grain weight but its contribution was indirectly via ear girth. The direct effect of days to maturity on grain yield per plant is negligible. Khairwal *et al.*

(1990) observed that days to 50 per cent heading had very poor or negative effect on grain yield. On seeing the maximum contribution of characters to the grain yield, the prime importance should be given to the number of productive tillers followed by ear girth, ear length and plant height. Mukherji *et al.* (1982) also suggested the improvement in yield through selection can be achieved by concentrating on higher number of effective tillers and plant height might improve the yield potential.

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INFLUENCE OF IRRIGATION AND NITROGEN ON PLANT WATER STATUS AND THERMAL RESPONSES OF MAIZE, *Zea mays*

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ABSTRACT

Stomatal conductance, transpiration rate and canopy temperature served as indicators of stress and were measured using a steady state porometer and infrared thermometer, respectively, in different treatments of maize (*Zea mays* L.) grown on moderately well drained sandy clay loam soil of Coimbatore. In general, stomatal conductance and transpiration rates were increased from 25 to 50 days after sowing thereafter declined upto maturity. Higher stomatal conductance and transpiration rates were associated with irrigation scheduling based on 0.75 IW/CPE ratio due to more frequent and adequate water availability. Among the methods of irrigation, every furrow method recorded highest stomatal conductance and transpiration rate irrespective of the stages of the plant growth. Nitrogen application increased the transpiration rate and stomatal conductance. Increased canopy temperature was recorded with irrigation scheduled based on 0.50 IW/CPE ratio due to less frequent and inadequate irrigation. Cooler canopies were associated with adequate moisture content and canopy temperature was progressively higher with increasing soil moisture stress at all stages of the growth. Higher doses of nitrogen application reduced the canopy temperature at all stages of the crop growth. Higher grain yield was recorded at 0.75 IW/CPE ratio with all furrow method of irrigation and with 175 kg N ha⁻¹.

KEY WORDS : Irrigation, Nitrogen, Plant Water, Maize