

Inter-relationship of Mimosine, Crude Protein, IVDMD and Cell Wall Constituents in *Leucaena leucocephala*

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Leucaena leucocephala (Lam.) de Wit, a leguminous tree from Central America and Mexico is now widely grown in semi-arid tropics. Its leaves are rich in protein, but suffer from a drawback as they contain toxic amino acid, i.e. mimosine. Quality traits like crude protein, mimosine, *in vitro* dry matter digestibility (IVDMD) etc. have been studied in various entries of *L. leucocephala* (Echeverri et al. 1987). The knowledge of relationships among these quality traits reported here will help the breeder to plan strategy for evolving low mimosine lines with better quality.

Nineteen lines of *L. leucocephala* were grown in a randomised complete block design with three replications. Each entry was grown in single row of 20 m length accommodating 20 trees. Row to row distance was 2 m. Leaf samples from ten trees in each replication were taken randomly and analysed for these for analysis. Mimosine content was determined as per the procedure given by Matsumoto and Sherman (1951). The method for

analysis of other quality traits is as described by Gupta et al. (1986). The genotypic and phenotypic correlation coefficients were computed as suggested by Al-Jibouri et al. (1958).

Genotypic and phenotypic correlation coefficients between all possible pairs of nine traits are presented in Table 1. Genotypic correlation coefficients were only marginally higher than their corresponding phenotypic correlation coefficients for all the pairs of characters showing that there is little environmental effect on the expression of quality traits. The cell wall constituents viz., neutral detergent fibre (NDF), acid detergent fibre (ADF), lignin and cellulose were having positive and highly significant relationship among themselves except lignin content with cellulose which was positive but non-significant. The correlation coefficients among different pairs of remaining characters viz., mimosine, crude protein, IVDMD, silica and hemicellulose were also positive, but association of silica with crude protein only was highly significant. The

Table 1. Genotypic (above diagonal) and phenotypic (below diagonal) correlation coefficient in subabul

	Mimosine	Crude protein	IVDMD	NDF	ADF	Lignin	Cellulose	Silica	Hemi-cellulose
Mimosine		0.426	0.166	-0.108	-0.144	-0.206	-0.057	0.533	0.167
Crude protein	0.393		0.245	-0.214	-0.207	-0.152	-0.229	0.721	0.070
IVDMD	0.111	0.195		-0.506	-0.513	-0.407	-0.333	0.278	0.294
NDF	-0.098	-0.213	-0.384		0.933	0.712	0.685	-0.403	-0.342
ADF	-0.140	-0.198	-0.362	0.007**		0.841	0.626	-0.451	-0.658
Lignin	-0.199	-0.146	-0.276	0.695**	0.828**		0.107	-0.404	-0.698
Cellulose	-0.058	-0.222	-0.247	0.660**	0.616**	0.104		-0.252	-0.207
Silica	0.431	0.638**	0.123	-0.353	-0.404	-0.385	-0.298		0.316
Hemi-cellulose	0.164	0.067	0.138	-0.264	-0.620**	-0.651**	-0.223	0.299	

*P < 0.05

**P < 0.01

associations of these five traits with NDF, ADF, lignin and cellulose were negative at both genotypic and phenotypic levels. However, the association of hemicellulose with ADF and lignin were highly significant. The two important traits i.e. mimosine content and IVDMD had no significant association with any of the other quality traits under study implying that it may be possible to select lines with low mimosine and high IVDMD without any significant effect on other quality characteristics.

Thus it may be possible to select varieties/lines low in mimosine content by following simple selection procedures.

References

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