

Selection of elite *bidi* tobacco (*Nicotiana tabacum* L.) genotypes through G x E interaction studies and Stability assessment

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ABSTRACT

Stability analysis was carried out with 31 drought-tolerant *bidi* tobacco (*Nicotiana tabacum* L.) genotypes evaluated across four environments representing two locations (RARS, Nandyal, Acharya N.G. Ranga Agricultural University and ICAR–CTRI, Research Station, Kandukur) under normal and moisture stress conditions during 2023-24. Combined ANOVA revealed highly significant ($p < 0.001$) effects of genotypes, environments, and genotype $\times$ environment interactions (GEI) for cured leaf yield, with environments contributing the highest proportion of variation (82.98%) followed by genotype $\times$ environment interaction (12.37%) and genotypes (4.65%). GEI was partitioned employing Additive Main Effects and Multiplicative Interaction (AMMI) model into two significant principal components, explaining 89.7% of interaction variance. AMMI biplots revealed that genotypes ABD 54, ABD 118, NyBD 62 and NyBD 61 were stable and high-yielding across environments, while NyBD 84 and NyBD 85 were specifically adapted to favourable conditions at Nandyal. The integration of AMMI Stability Value (ASV) with the Culling Simultaneous Selection Index (C-SSI) identified ABD 132 (NP2), ABD 54, and NBD 154 as the most stable and high-yielding genotypes. These findings underscore the importance of environment-specific evaluation and AMMI and CSSI based selection for identifying drought-resilient *bidi* tobacco cultivars suited to erratic moisture regimes.

Keywords: *AMMI model and High-yielding genotypes, Bidi tobacco (Nicotiana tabacum L.), Drought tolerance, Genotype $\times$ Environment Interaction (GEI), Multi-environment evaluation*