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Research Paper

GENETIC VARIATION IN PHOTOSYNTHETIC PARAMETERS AND SPAD CHLOROPHYLL CONTENT AMONG A DIVERSE SET OF MULBERRY (*MORUS* SPP.) GERMPLASM

M. S. Rukmangada[1], M. G. Sabitha[2], V. Sivaprasad[3] and V. Girish Naik[1*]

[1]Molecular Biology Laboratory - 1, Central Sericultural Research and Training Institute, Srirampura, Mysuru 570008, India.

[2]Mulberry Physiology Laboratory, Central Sericultural Research and Training Institute, Srirampura, Mysuru 570008, India.

[3]Central Sericultural Research and Training Institute, Srirampura, Mysuru 570008, India.

[*]E-mail: vgirishnaik@yahoo.com

ABSTRACT

Mulberry being one of the fastest growing plants under cultivation, the natural genetic variation existing in the photosynthesis traits can find potential application in designing varieties to meet the challenges of climate change and sustainable farming. In this study, we report the genetic variation in six photosynthetic parameters and SPAD chlorophyll content among 204 diverse set of mulberry germplasm, recorded in two seasons. The coefficient of variation (%) was at par in two recording periods (August, 2015 and November – December, 2105) for net photosynthetic rate – P_N (10.6 and 14.5), stomatal conductance – g_S (25.78 and 28.24), transpiration rate – *E* (19.43 and 20.19), intercellular CO_2 concentration – C_i (7.05 and 7.10), intrinsic water use efficiency – IWUE (19.33 and 24.13), vapor pressure deficit – VPD (8.26 and 9.24), respectively under moisture saturated regime. The variability in SPAD chlorophyll content ranged from 30.73 to 47.37 in August against 24.60 to 45.47 in November-December with higher mean recorded in the latter season. Positive correlations were observed among P_N, g_S, *E* and C_i ($p < 0.001$) in both the seasons except in the case of C_i in the second season. P_N, g_S, *E* and C_i were negatively correlated with IWUE and VPD in both the seasons. The decreased *E* without much compromise on the P_N under higher VPD and reduced g_S will be the basis for development of moisture stress tolerant varieties. The germplasm with higher IWUE and P_N may confer genetic difference in heat avoidance and may have implication in higher productivity under changing climatic condition. The rate of photosynthesis will contribute significantly in biomass accumulation in mulberry provided other factors *viz*., leaf area, light interception *etc*. remain constant.

Key words: Carbon sequestration, genetic variability, growth, mulberry, photosynthetic traits