EFFECT OF REFLECTIVE MULCH ON WATER RELATIONS, PHOTOSYNTHESIS, AND RESPIRATION OF FOUR FINGER MILLET ACCESSIONS GROWN IN *ANURADHAPURA*, SRI LANKA

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Finger millet (*Eleusine coracana* L. Gaertn.) is believed to be a climate-resilient cereal. Even though a few finger millet accessions are screened for yield parameters, the effect of abiotic factors on their ecophysiological traits have not been evaluated. Reflective mulch may increase the light available for mutually shaded plant leaves in the lower canopies. This study was conducted in the Research Field, Rajarata University of Sri Lanka from January-April 2021; to screen the regulation of temperature and light by the reflective effect on physiological and environmental parameters of four finger millet accessions. Water potential at turgor loss point (π_{tlp}) and osmotic potential (Π_0) were measured with the pressure-volume approach and osmometry. The light saturated net photosynthetic rate (A_{sat}), leaf respiration in dark adapted leaves (R_d), predawn ($\Psi_{w\text{-}pd}$) and midday ($\Psi_{w\text{-}md}$) leaf water potential, soil gravimetric moisture content (SMC), soil matric water potential (Ψ_m), and soil temperature (T_{soil}) were measured. Results revealed no significant effect from the reflective mulch on environmental parameters (SMC, Ψ_m, T_{soil}) and ecophysiological traits monitored, limiting our ability to make inferences on the acclimation potential of ecophysiological traits. The low π_{tlp} values (-0.15 to -0.45) of TVFM013-1 and TVFM013-4 compared to Oshada and Ravana (-0.1 to -0.2) may infer that the former accessions are tolerant to drought. Leaf osmotic water potential at full hydration (Π_0) was tightly correlated with π_{tlp} ($R^2=0.81$) suggesting that the drought tolerance is achieved by accumulation of extra solutes. The osmotic potential estimated from the two methods showed a low correlation (Pearson $r=0.44$ $p=0.00012$) possibly due to the dilution by the apoplastic water and solute dissolution from destroyed cell walls. Additional work is recommended to examine the acclimation potential of Π_0 and π_{tlp} among the finger millet accessions.

Keywords: Drought tolerance, Soil moisture content, Ecophysiological traits, Osmotic potential, Turgor loss point