



## Research Paper

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# Effect of clonal rootstocks on the stomatal conductance, transpiration rate, photosynthetic rate and leaf nutrient status of apple cultivars scarlet gala and red fuji

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**ABSTRACT :** A field experiment was conducted on five rootstocks viz., EMLA 9, EMLA 26, EMLA 7, EMLA 106 and EMLA 111 on 12 year old plantations of two cultivars viz., Scarlet Gala and Red Fuji. The experiment was laid out to study the effect of clonal rootstocks on the stomatal conductance, transpiration rate, photosynthetic rate and leaf nutrient status of the scion grafted on them. The experiment was laid out in a split plot design with 5 rootstocks and two cultivars with the treatment combinations of 10 and replicated 5 times. The maximum stomatal conductance (0.17 and 0.20 mol/m<sup>2</sup>/s), transpiration rate (3.88 and 3.93 m mol/m/s) and photosynthetic rate (11.08 and 11.16 μ mol/m<sup>2</sup>/s) during 2008 and 2009, respectively, were observed in EMLA 7 rootstock. Red Fuji on EMLA 7 rootstock recorded the maximum stomatal conductance (0.18 and 0.22 mol/m<sup>2</sup>/s), transpiration rate (3.92 and 3.99 m mol/m<sup>2</sup>/s) and photosynthetic rate (11.32 and 11.39 μ mol/m<sup>2</sup>/s) as compared to Scarlet Gala on EMLA 26 rootstock which recorded the minimum values of all these parameters. The maximum content of leaf leaf nitrogen (2.23% and 2.26%), leaf phosphorus (0.154 % and 0.159%) and leaf potassium (1.64% and 1.65%) and leaf calcium content (1.66% and 1.69%) was recorded in EMLA 111 rootstock during 2008 and 2009, respectively, whereas the maximum leaf magnesium content (0.51% in 2008 and 0.56 % in 2009) was recorded in EMLA 7 rootstock. Red Fuji on EMLA 111 rootstock recorded maximum of N, P, K, however, Scarlet Gala on EMLA 111 rootstock recorded the maximum of leaf calcium. Scarlet Gala on EMLA 7 rootstock recorded maximum of leaf magnesium content. Based on these results, it may be inferred that Red Fuji on EMLA 111 and Scarlet Gala on EMLA 7 rootstock performed better in terms of photosynthetic efficiency and nutritional uptake.

**KEY WORDS :** Clonal rootstocks, Apple, Stomatal conductance, Photosynthetic efficiency

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