

RELATIONSHIP BETWEEN TEA (*CAMELLIA SINENSIS*) LEAF UPTAKE OF MAJOR NUTRIENTS, NITROGEN, PHOSPHOROUS AND POTASSIUM (NPK) AND LEAF ANATOMY OF DIFFERENT VARIETIES GROWN IN THE KENYAN HIGHLANDS

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ABSTRACT

Uptake of major nutrients (NPK) through the leaf studies were carried out on three varieties of tea grown in the Kenyan Highlands. A foliar fertilizers trial was setup in three sites comprising of 36 plots per site in the major tea growing regions in Kenya. The uptake of NPK through leaf tissue and the role of leaf anatomy were investigated. Two foliar fertilizers tested were Foliar Fertilizer 1 (FF1) and Foliar Fertilizer 2 (FF2), a positive control of Soil Fertilizer (SF) and a blank were used to standardize the method. Leaf anatomical studies were done by determining the stomata count of the third leaf of sample plants from each plot in all the trial sites. Results showed significant correlation between stomata count and first mature leaf nutrients; N ($r=0.387$, $p\leq 0.05$), P ($r=0.32$, $p\leq 0.01$) and K% ($r=-0.014$, $p\leq 0.01$). Tea yields were found to correlate significantly with NPK nutrient uptake; N% $r=0.453$ ($p\leq 0.01$), P% $r=-0.332$, $p\leq 0.01$ and K% $r=-0.373$, $p\leq 0.05$. Stomatal patterns and density responded to the environment, where Kericho site (west of Rift Valley) had significantly higher stomata count than Kirinyaga and Meru sites both in east of Rift valley at HSD= 6.5, 5.6 at $p\leq 0.05$ respectively. Overall the leaf anatomy, i.e. epidermal layers ($<50\mu\text{m}$ thick), palisade layers ($50\mu\text{m}$ thick) and mesophyll layers ($150-200\mu\text{m}$) were not affected by fertilizer application.

KEYWORDS: Tea, Leaf Uptake, Leaf Anatomy, Foliar Fertilizer



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