

(137)

**Assessing the Effect of Selected Soil Quality Parameters on the Risk Levels of Urban Trees in Colombo**

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**Abstract**

Urban tree failure poses growing risks to public safety and infrastructure in densely built cities like Colombo, where trees are subjected to compacted soils, restricted rooting spaces, and altered hydrological conditions. Understanding how certain soil properties influence tree stability is crucial for developing sustainable urban forestry practices. Therefore, this study assessed how selected soil quality parameters: dry and wet bulk density, soil temperature, oxidation-reduction potential (ORP), pH, and soil moisture influenced the risk level of urban trees in two selected locations: Viharamahadevi park which represented an open green space and Keppetipola road which represented a confined roadside. Three soil samples were collected per tree within a 2.5 m radius from the root collar, from 15 trees for each location which were previously categorized into 3 risk levels; low, moderate and high. Risk categorization was done using Visual Tree Risk Assessment (VTRA). The risk of each tree was quantified, assigning a risk score to each tree. Relationships between soil properties and quantified tree risk scores were evaluated using Spearman's rank correlation (MINITAB 21) statistical software. Moisture content showed a strong positive correlation with overall tree risk level among all tested soil parameters according to the correlation analysis in Viharamahadevi park. In Keppetipola road, moisture content showed a moderately negative correlation and dry bulk density showed a moderately positive correlation indicating contrasting patterns to the other location. Findings suggested that waterlogged soils may weaken anchorage and encourage internal root decay in trees at Viharamahadevi park, and drier soils in compacted tree pits may worsen stability and increase physiological stress in trees at Keppetipola road. This inverse relationship emphasizes how soil conditions in urban settings vary depending on the context.

**Keywords:** *Urban forestry, Tree stability, Soil properties, Urban tree risk assessment, Colombo Sri Lanka*