

Title: Examining Hydraulic Safety Margins in the Context of Drought Mortality Rates

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Project Abstract:

Moist tropical forests are home to an estimated 50-60% of Earth's species and are responsible for about 50% of terrestrial gross primary productivity. However, climate change, including drought, is driving tree mortality and leading to forest degradation across the globe. We investigated if species' drought mortality rates were associated with plant hydraulic and water relations traits, including hydraulic safety margins, i.e. the extent to which plants buffer themselves from thresholds of water stress. To test this, we used long-term census data from ForestGEO to determine species-specific drought mortality rates across multiple sites in Panama. We then compared these drought mortality rates with hydraulic traits, including gas exchange, water potentials, turgor loss point, and hydraulic safety margins. Along a continuum of drought mortality rates, we found that drought vulnerable species were generally more light-demanding, while drought resistant species were generally more shade tolerant. However, initial results indicated that drought mortality rates were not coordinated with hydraulic traits, including hydraulic safety margins.