LEAF ANATOMICAL ADAPTATIONS OF TWO NON TIMBER SPECIES INTRODUCED TO THE *PINUS CARIBAEA* PLANTATION IN THE SINHARAJA BUFFER ZONE, SRI LANKA

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This study examined the adaptability of two non-timber liana species *Coscinium fenestratum* Colebr. (Menispermaceae) and *Calamus ovoideus* Thw. (Arecaceae) grown under different light intensities in a forest restoration trial established in 1991 in the *Pinus caribaea* buffer zone in Sinharaja. Enrichment species have been introduced to different tree gaps that have different light regimes, created by removing 3 pine rows (3R) or 1 pine row (1R) where the initial light intensities in the gaps were 22 and 10 mol/m^2/day respectively. Furthermore, the species have been introduced to the understorey of 3 intact (3U) pine rows (5 mol/m^2/day) and to the intact closed canopy (CU) where pine trees have not been removed (3 mol/m^2/day). During the past 12 years (1991-2003) the pine trees as well as the introduced enrichment species have grown while the initial light intensities in the gaps have gradually changed. The study assesses how the two liana species have responded to varying light levels available in the respective gaps since 1991. Stomatal indices and anatomical measurements were taken from epidermal peels and 15 μ wax embedded lamina cross sections of the leaves of the two study species collected from the middle canopy level of each light treatment.

Stomatal index of *Calamus ovoideus* was least in 3R (14.07%) and highest in the control (17.9%), thus showing drought tolerance under open canopy treatments. However, in *Coscinium fenestratum* stomatal index was highest in 3R (9.5%). Highest leaf blade thickness was recorded under closed canopy area for both *C. ovoideus* (13.3μ ±0.40) and *C. fenestratum* (10.96μ ±0.66) because the effect of shading by upper canopy is low since the number of surviving individuals in CU are less. Cuticle thickness was more or less the same in all treatments with the highest thickness shown by *C. fenestratum* (0.34μ ±0.02) under 1R while in *C. ovoideus* (0.358μ ±0.03) under 3R. Highest upper epidermal thickness was recorded in 3R for *C. ovoideus* (1.08μ ±0.03) while it was highest for *C. fenestratum* (1.09μ ±0.04) in 1R.

Palisade layer was thicker under CU (3.93μ±0.36) for *C. fenestratum* and under 1R (3.98μ ±0.33) for *C. ovoideus*. *C. fenestratum* showed better adaptations in higher light levels as well as in lower light levels thus, *C. fenestratum* do not show drastic variations in leaf anatomy in response to different light levels. However, *C. ovoideus* has denser palisade in higher light levels for efficient propagation of absorbed light deeper into the spongy mesophyll and comparatively less dense palisade in lower light levels. Spongy:palisade ratio did not show significant differences within treatments. *C. ovoideus* showed the highest ratio (2.3) in CU while *C. fenestratum* showed the highest ratio (1.6) in 3U since a thicker Spongy mesophyll is important to capture maximum sunlight available, under lower light levels.

Overall results in terms of leaf anatomical adaptations show that *C. fenestratum* could be successfully grown in 1R treatment while *C. ovoideus* in 3R and 1R treatments. The results of this study could be used as a guideline for the selection of specific microhabitats when these species are used in future forest restoration programs.

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