The Effect of Epiphyllous Lichen Cover on Leaf Water Retention

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INTRODUCTION

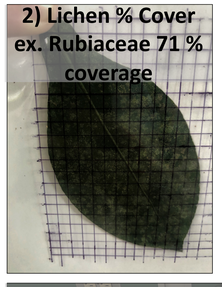
Leaf water shedding is an important process in tropical plants. Drip tips have evolved in plants to prevent prolonged water retention that can lead to pathogenic fungal colonization and decreased gas exchange on stomatal sites.

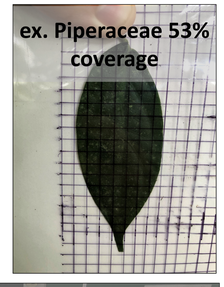
Lichen growth on leaves is also common in tropical regions due to the high humidity. Many studies have evaluated the effect water has on the epiphyllous colonization of lichen and bryophytes (Burd 2007, Coley & Kursar 1996, Coley et al. 1993 & Ivey and DeSilva 2001).

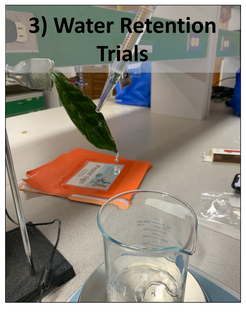
Lichen may affect the physical texture or polarity of a leaf's surface which would impact its ability to retain water.

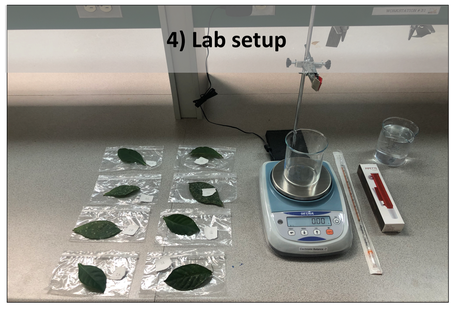
We tested the effect that lichen have on the leaf's ability to shed water in two plant families with different drip tip morphologies across a gradient of lichen cover.

METHODS









Epiphyllous lichen cover increases leaf water retention on Piperacae (narrow drip tip) leaves but *not* on the Rubiaceae (broad drip tip) leaves.

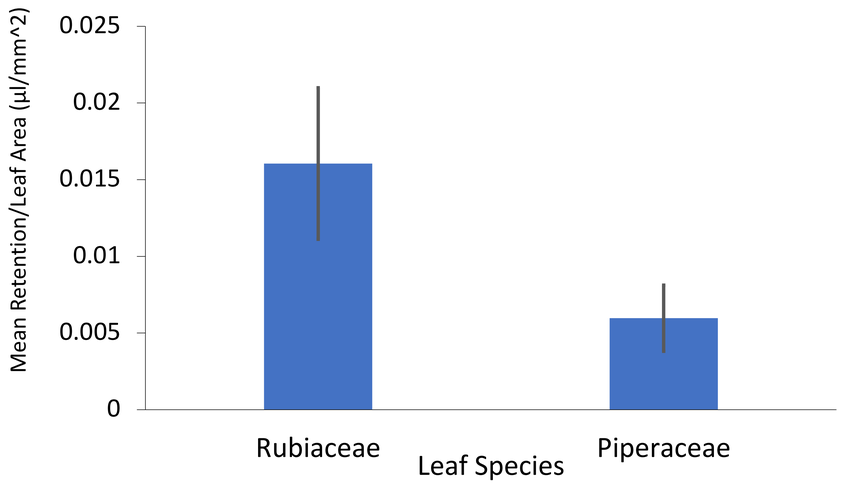


Figure 1: Mean water retention per leaf area of the two leaf types. Rubiaceae Leaves = 0.016 μl/mm^2 and Piperaceae Leaves = 0.006 μl/mm^2. Error bars represent $\pm$ 1SD (n=20).

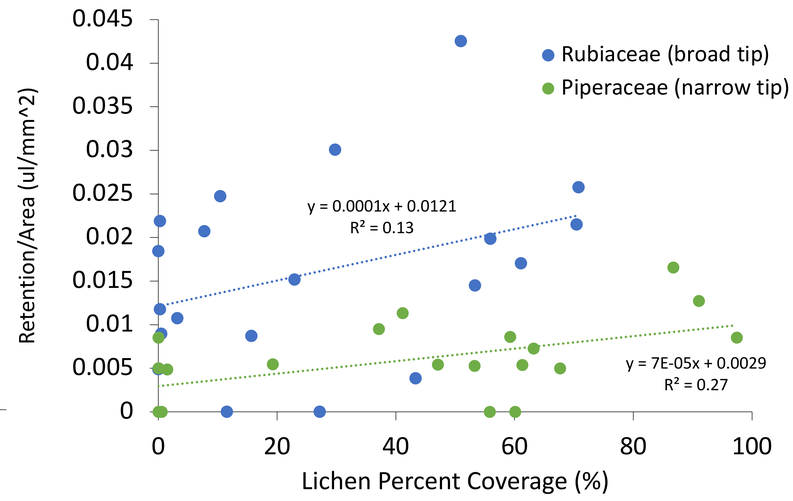
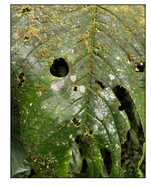


Figure 2: Correlation between water retention per leaf area and % lichen coverage for both leaf families (Blue = "Broad" Rubiaceae, Green = "Narrow" Piperaceae); n=20 leaves for both species.

RESULTS & DISCUSSION

There was significantly more water retained per leaf area in the Rubiaceae (broad) leaves which was expected because the drip tips are much shorter than the Piperaceae (narrow) leaves. However, there may be other mechanistic reasons the water retention differs between the two families (i.e.. leaf surface polarity or trichome structures) that were not tested.

There was a positive correlation between lichen percent coverage and water retention per leaf area that was significant for the Piperaceae leaves (r^2 = 0.27, p = 0.02). The correlation was not significant for the Rubiaceae leaves (p = 0.12). Lichen cover may only have slight effect of increasing leaf water retention. It is possible that, with a larger sample size and range of leaf sizes, this effect would be more pronounced.



Acknowledgements & Literature Cited

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