

## INTRODUCTION

- Plants of the family Bromeliaceae, most of which are epiphytic on tropical trees, contains their own mini aquatic ecosystem making them perfect for studying community diversity and aquatic food webs.
- A relationship between the bromeliad size and arthropod species abundance has been shown through previous studies (Srivastava et al., 2005).
- It is suggested that arthropod community structure is effected by primary production (Brouard et al, 2011).

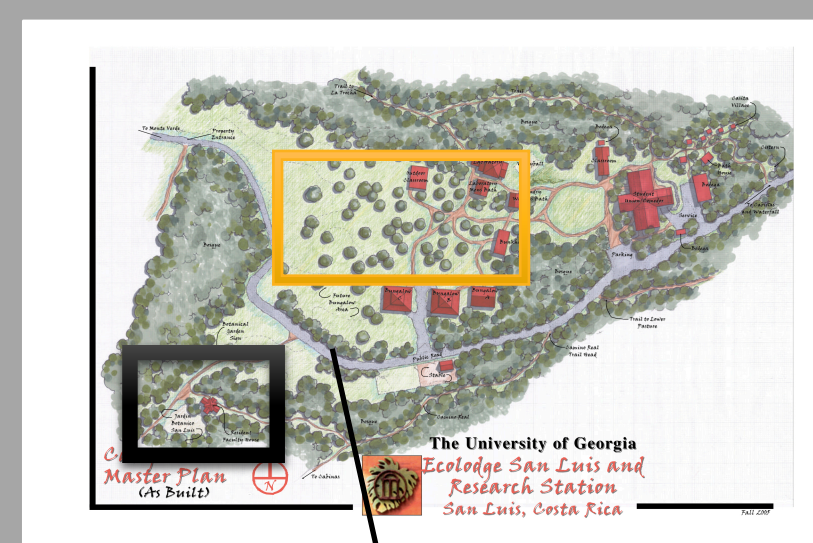


## OBJECTIVE & HYPOTHESES

- The purpose of this study was to analyze the relationship between abiotic factors and arthropod community structure in bromeliads across open and closed habitats.
- We hypothesized a positive correlation between bromeliad size and water volume and between species richness and water volume.
- We hypothesized that arthropod species richness will be higher in open habitats where there is increased solar radiation and higher productivity compared to closed habitats.
- We hypothesized that total suspended solids would be higher in closed habitats due to higher detrital inputs.

## STUDY SITE & METHODS

- This study was conducted in a pre-montane cloud forest located at University of Georgia Costa Rica campus in San Luis de Monteverde.
- The yellow box indicates the open habitat and the black box indicates the closed habitat
- For each bromeliad plant diameter (cm), water volume (ml) and canopy cover were measured.
- Arthropods were collected from bromeliads and identified to family.



## RESULTS

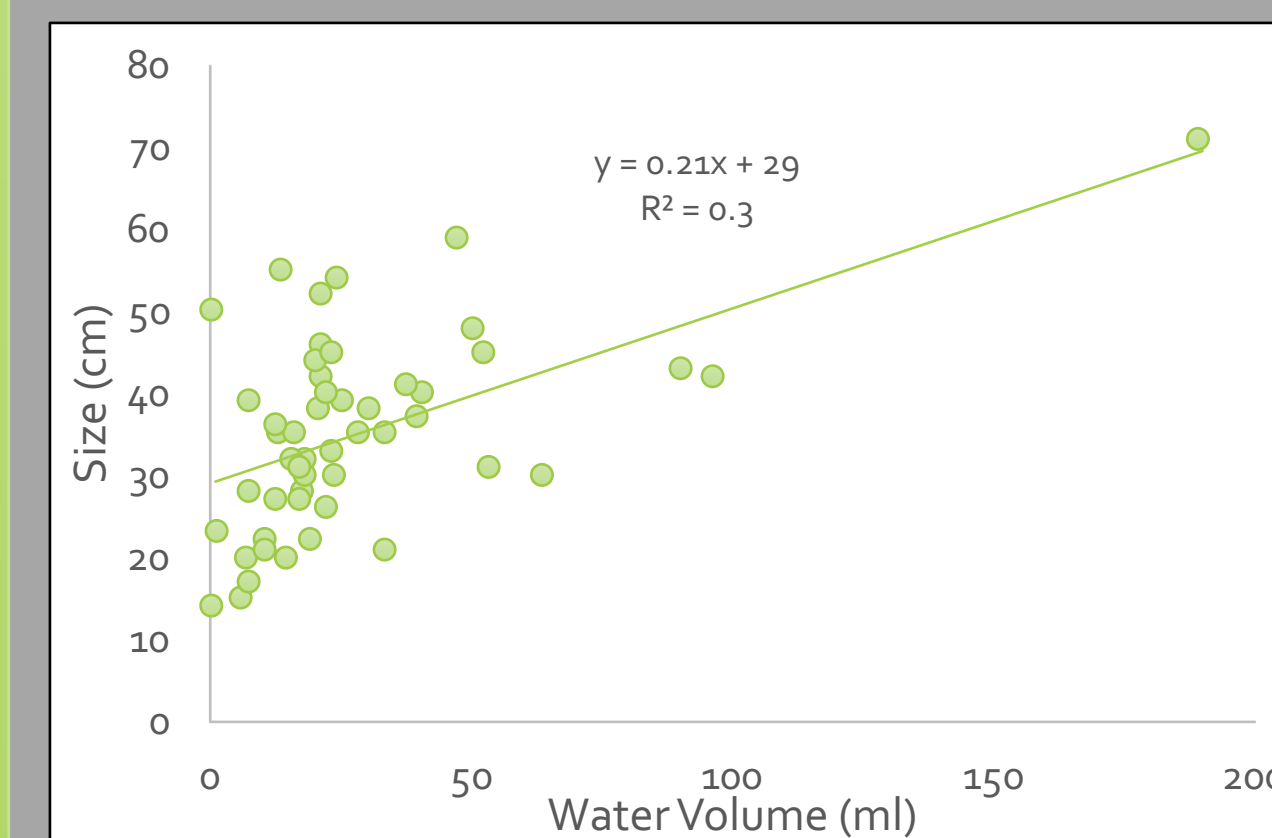


Figure 1. Bromeliad size(cm) vs water volume(ml) ( $p < 0.001$ ,  $R^2 = 0.3$ )

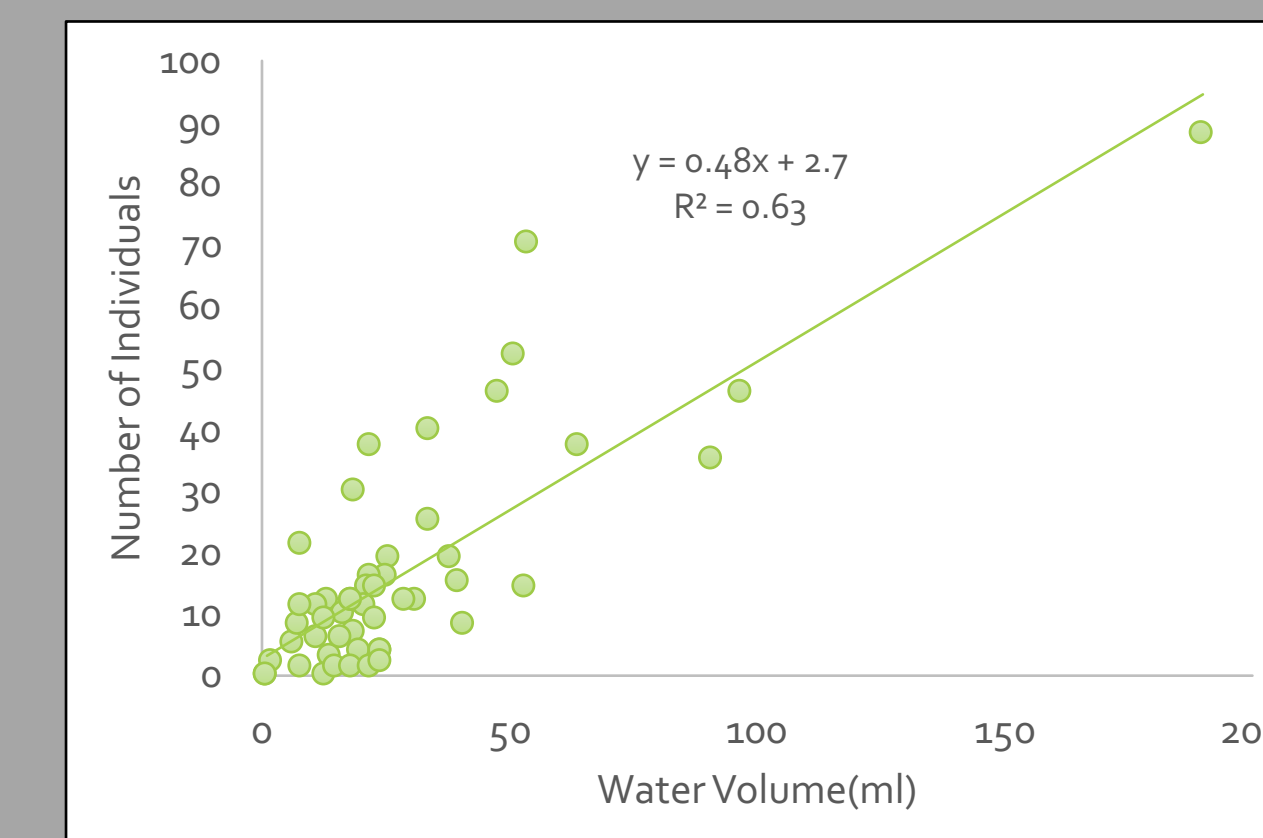


Figure 2. Arthropod abundance vs water volume(ml) ( $p < 0.001$ ,  $R^2 = 0.63$ )

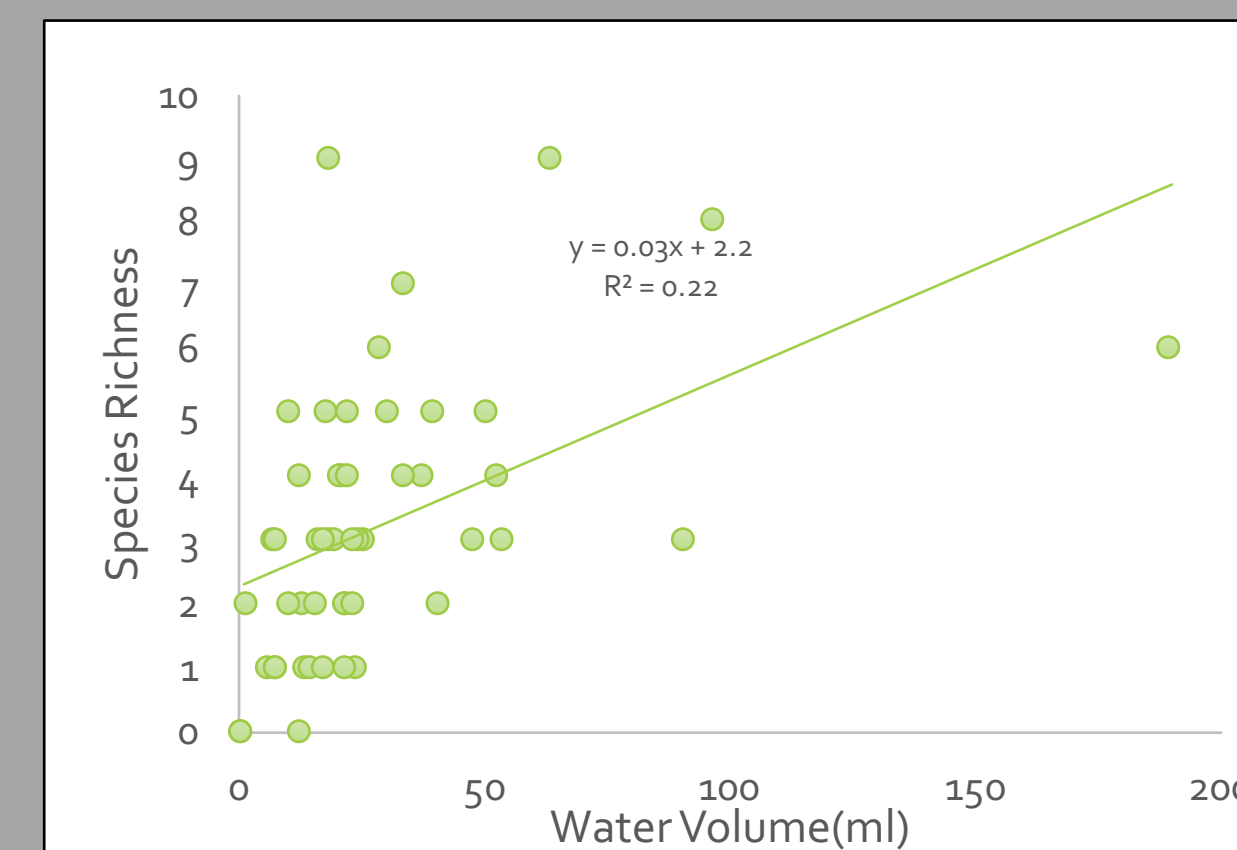


Figure 3. Arthropod species richness vs water volume(ml) ( $p < 0.001$ ,  $R^2 = 0.22$ )

- As bromeliad size increases the water volume increases (Figure 1)
- As water volume increases there is also an increase in Arthropod species abundance and richness. (Figures 2 & 3)

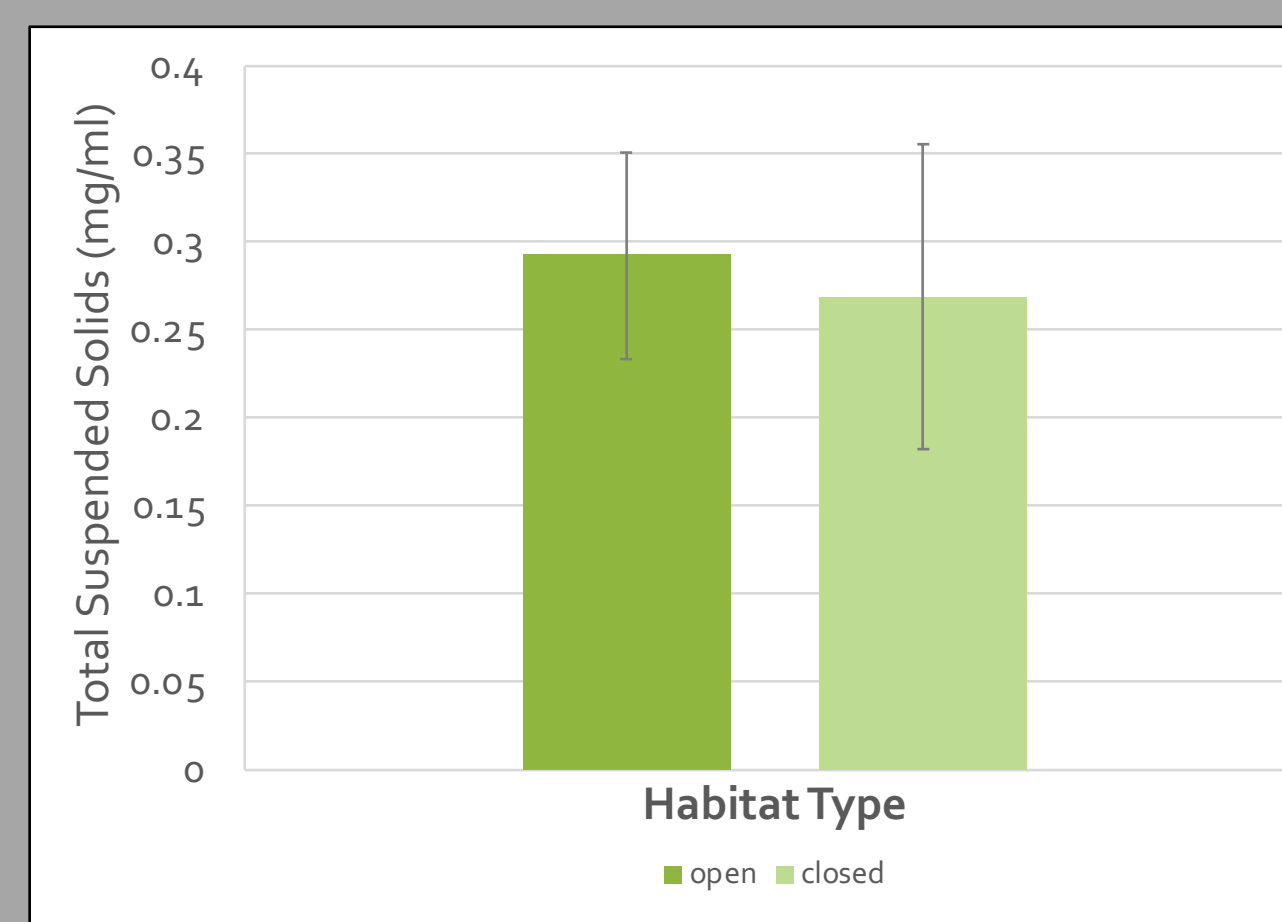


Figure 4. Total suspended solids(TSS) for all samples  $n=20$  in open and closed habitats (error bars  $\pm 1SE$ )

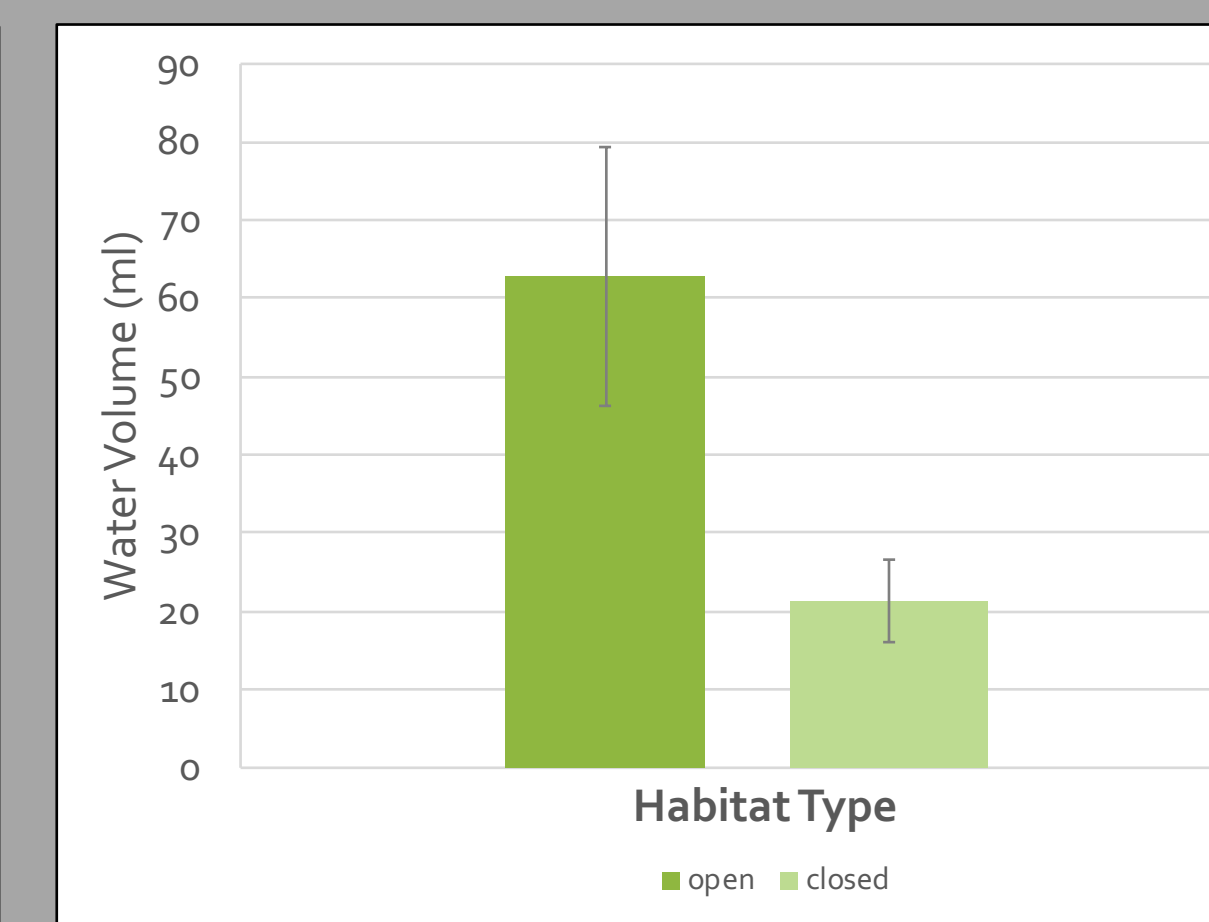


Figure 5. Average Water Volume in open and closed habitats (error bars  $\pm 1SE$ )

- There is no significant difference in the amount of total suspended solids between the habitats (Figure 4)
- On average there is a greater water volume in bromeliads in the open habitat (Figure 5)

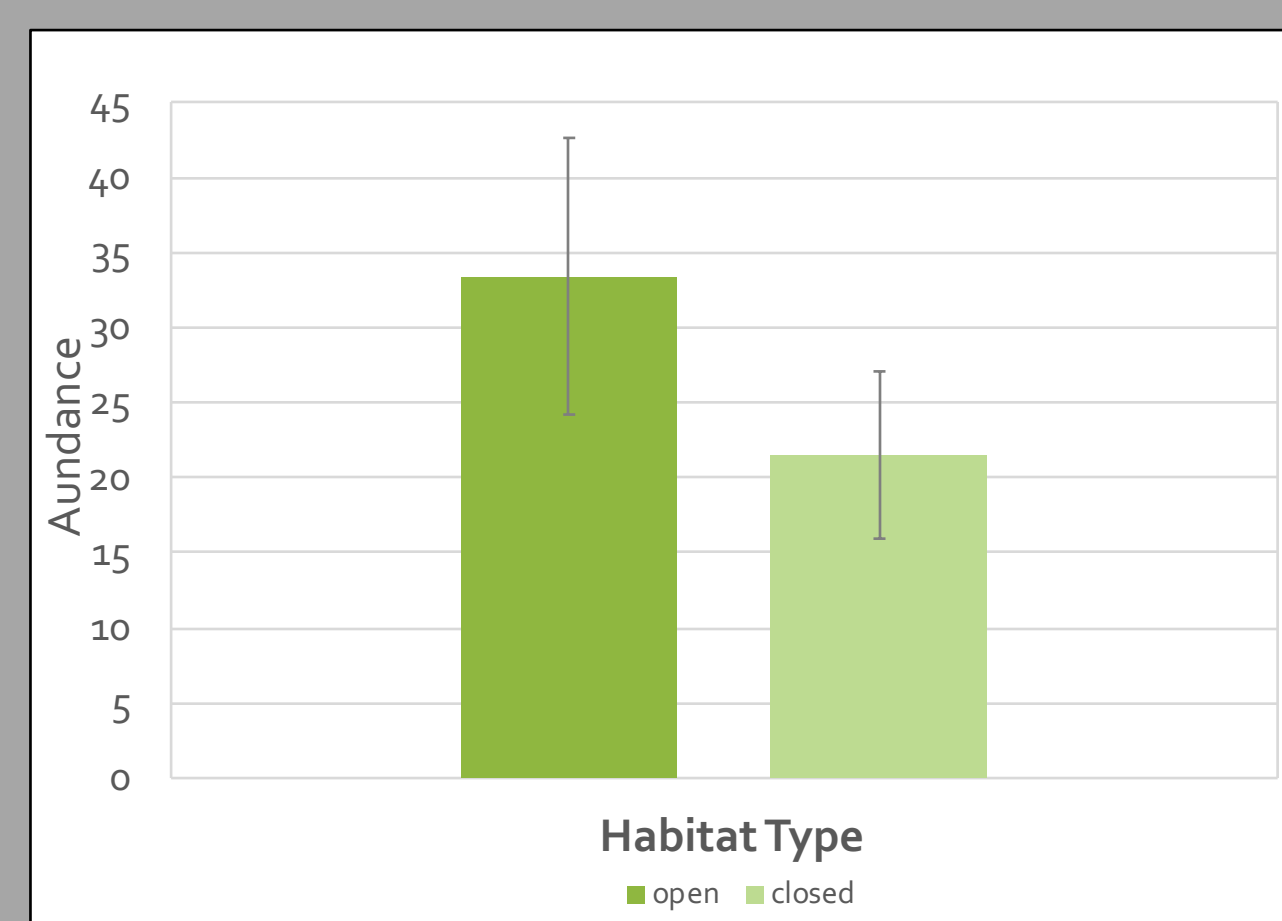


Figure 6. Average arthropod abundance for all samples  $n=20$  in open and closed habitats (error bars  $\pm 1SE$ )

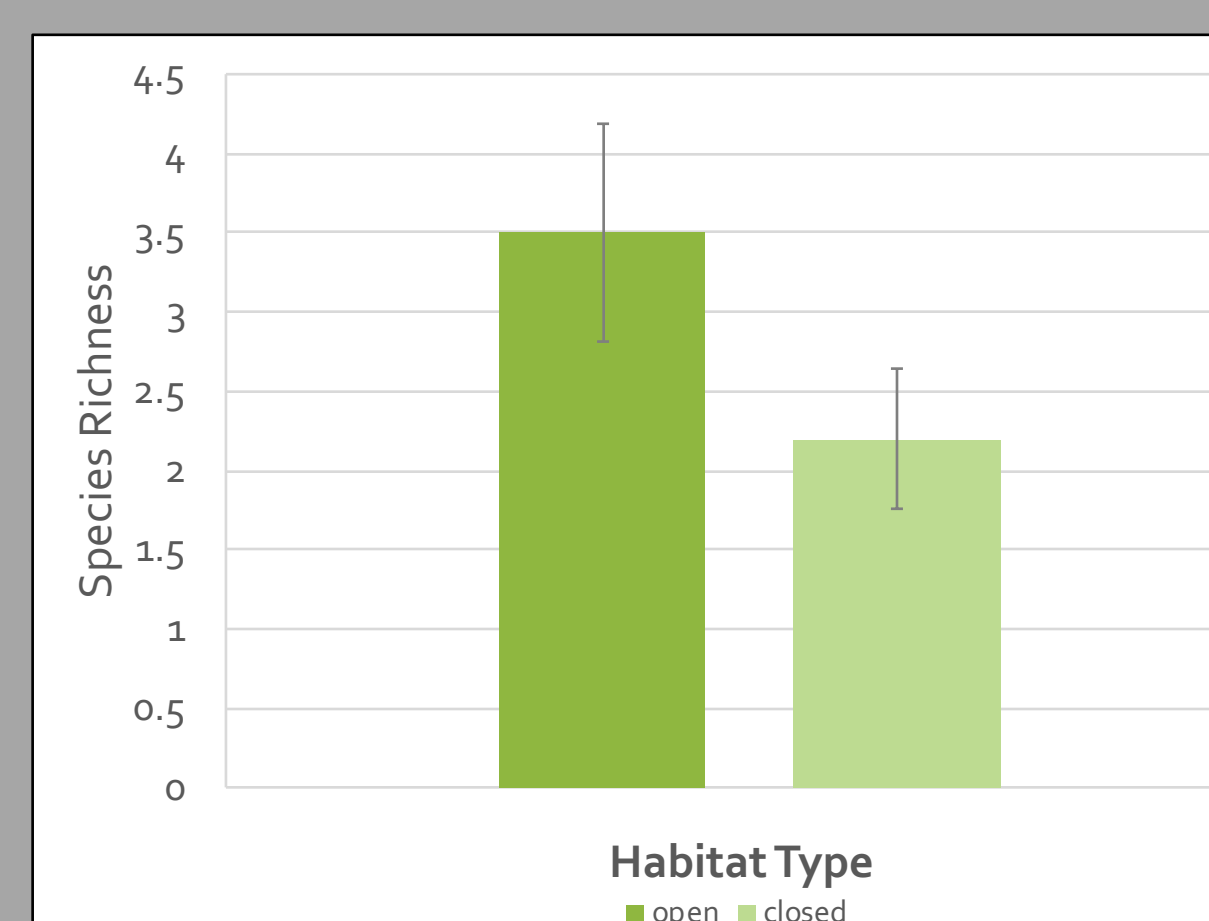


Figure 7. Average arthropod species richness for all samples  $n=20$  in open and closed habitats (error bars  $\pm 1SE$ )

## RESULTS

- Arthropod species abundance and richness was greater in the open habitat (Figure 6 & 7)

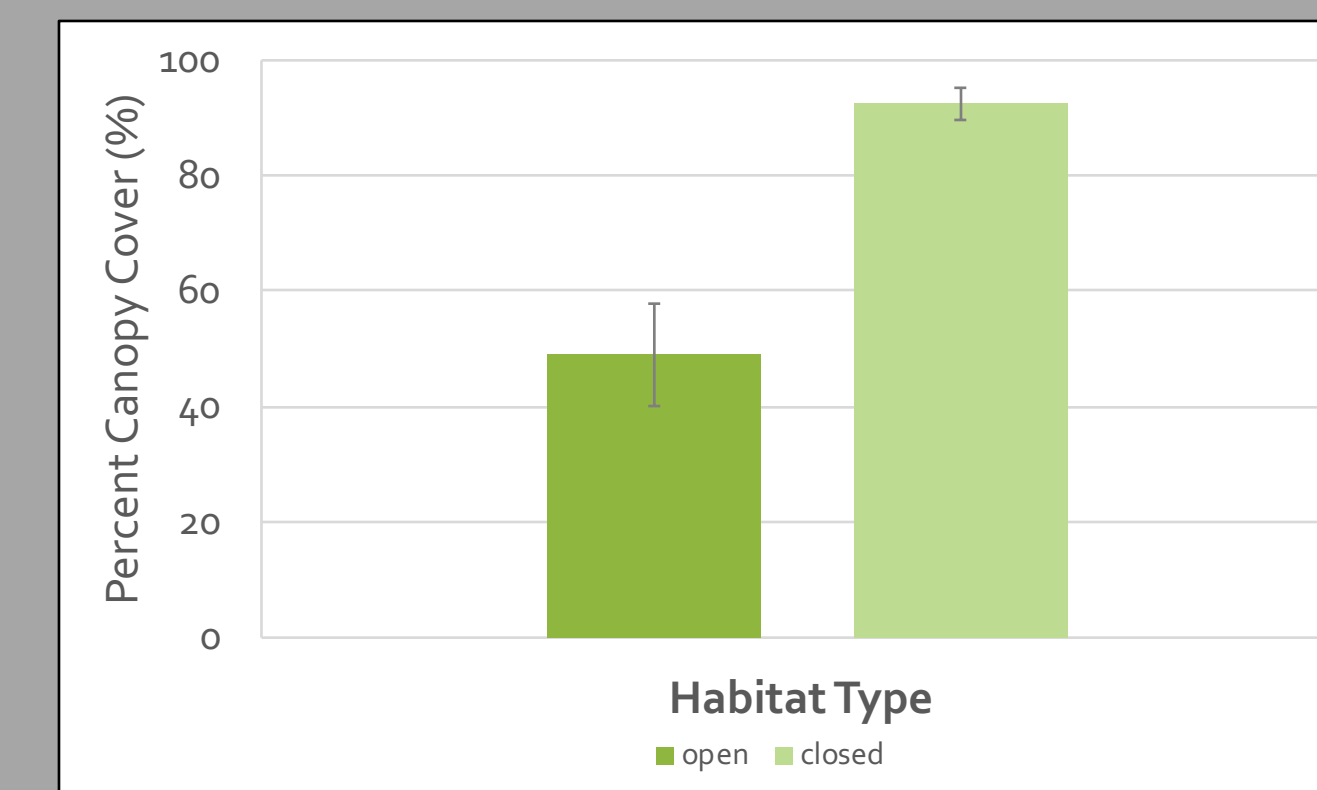


Figure 8. Average canopy Cover for open and closed habitats

The closed canopy had ~40% more cover than the open habitat. However, the open habitat had an average of 50% canopy cover.

## CONCLUSIONS & FUTURE STUDY

- Arthropod community structure is closely linked to habitat size and the volume of water available within the plant (Figure 1, 2, & 3)
- The open habitat had higher species abundance and richness (Figure 6 & 7), which could be due to the higher average water volume per bromeliad in the open habitat (Figure 5)
- Habitat had no effect on the amount of total suspended solids (TSS) (Figure 4)
- Future studies should focus on measuring the chlorophyll content of the bromeliad to see if there is more primary productivity in the open habitat versus the closed.
- Previous studies have shown that the concentration of chlorophyll-a is higher in larger bromeliads (Marino et al., 2011) and the algal communities within the bromeliad support the arthropod communities (Brouard et al, 2011)



## ACKNOWLEDGMENTS

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