Sapling Recruitment in an Old Growth Forest

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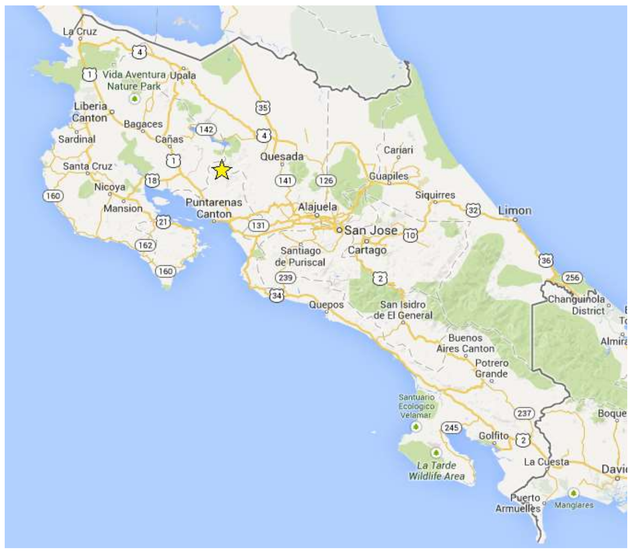
Introduction

This study investigates sapling recruitment in an old growth forest to gain a better understanding of cloud forest development in western Costa Rica. This new data concerning saplings was joined with information from a previous study concerning the makeup and distribution of adult trees in the same forest plot. Joining this information gives us a better understanding of the forest dynamics in this area. By knowing the makeup of the forest and by looking at saplings, we can see where new tree recruitment is stemming, how the forest will change in the future, and better replicate it in plans for future reforestation efforts in the area.

Location

This study will continue the research in a permanent plot of an old growth forest on the UGA Costa Rica campus that was established in 2012. This plot is located in San Luis, Costa Rica, just a few kilometers outside the Monteverde Cloud Forest Reserve. Reforestation is especially important in this region, but it is difficult to accomplish without a better understanding of old growth forests in this region.



Methods

In this study we randomly surveyed areas of saplings within the 1 ha forest permanent plot. This plot is divided into 25 20m x 20m sub-plots. Within each sub-plot, the center of the study areas was determined using a random number generator. Each area was circular around the random center point and had a diameter of 5m. If there were not enough trees in a 5m radius circle, the length of the radius was adjusted so that there were 20 to 50 specimens within each sample area. Height, diameter breast height (DBH), health, X and Y coordinates, and species name of the trees between 2.5 and 10 cm DBH were recorded. We also tagged the trees with aluminum ID tags and 30cm cable ties, so they can be resurveyed in the future.

Conclusion

By studying the presence of saplings in an old growth forest, we were able to determine the preliminary characteristics of the current forest, such as diameter breast height (DBH), health, sapling height, X and Y coordinates, and the species name of each sapling. We were also able to compare and contrast the number of adult trees versus saplings for each species present in each plot, show in Figure 2 above, in order to find species' r^2 value. The largest r^2 value was 0.0853 of the *Inga punctata*. From this data, we will be able to see how the old growth forest's characteristics might change in the future.

Results

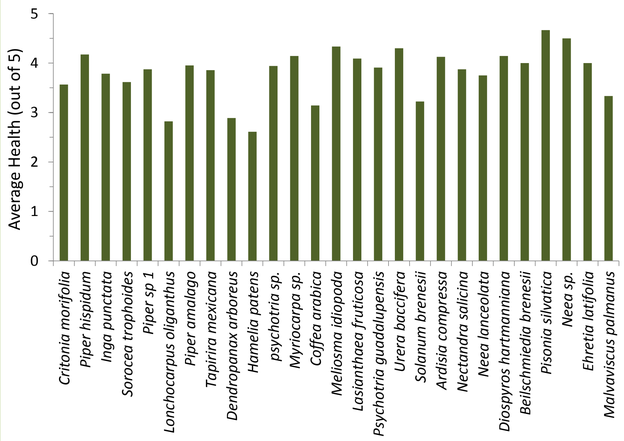


Figure 1. Bar graph of the average health of the 28 most populous tree species in the plot.

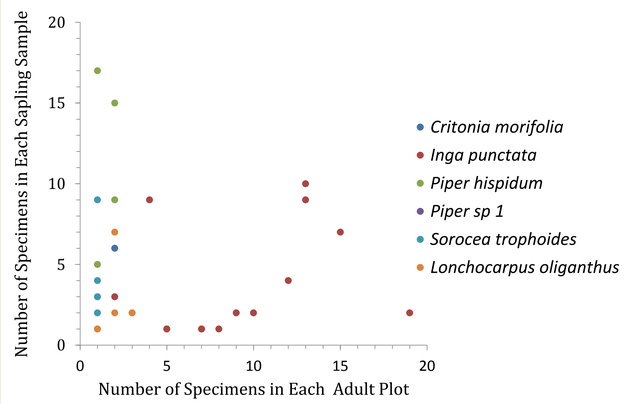


Figure 2. Graph of the correlation between adult trees and saplings of the top 5 most abundant species in each plot. *Piper sp 1* did not exist as an adult tree. *Critonia morifolia* only has one point, and therefore no r^2 Value. The *Inga punctata* r^2 value is 0.0853. The *Piper hispidum* r^2 value is 0.011. *Sorocea trophoides* does not have a r^2 value. The *Lonchocarpus oliganthus* r^2 value is 0.0392.

Table 1. Total number of specimens of each species within the sapling sampling areas.

Species	Count
Critonia morifolia	60
Piper hispidum	58
Inga punctata	56
Sorocea trophoides	52
Piper sp 1	32
Lonchocarpus oliganthus	28
Piper amalago	21
Tapirira mexicana	21
Dendropanax arboreus	18
Hamelia patens	18
psychotria sp.	17
Myriocarpa sp.	14
Coffea arabica	14
Meliosma idiopoda	12
Lasianthaea fruticosa	11
Psychotria guadalupensis	11
Urera baccifera	10
Solanum brenesii	9
Ardisia compressa	8
Nectandra salicina	8
Neea lanceolata	8
Diospyros hartmanniana	7
Beilschmiedia brenesii	7
Pisonia silvatica	6
Neea sp.	6
Ehretia latifolia	6
Malvaviscus palmanus	6

Future Work

Our project was a preliminary study of the saplings in this plot. With this initial data and the tagged trees, our plots can be reexamined to find growth rates and carbon sequestration, changes in community composition, and mortality rates.

Acknowledgments

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