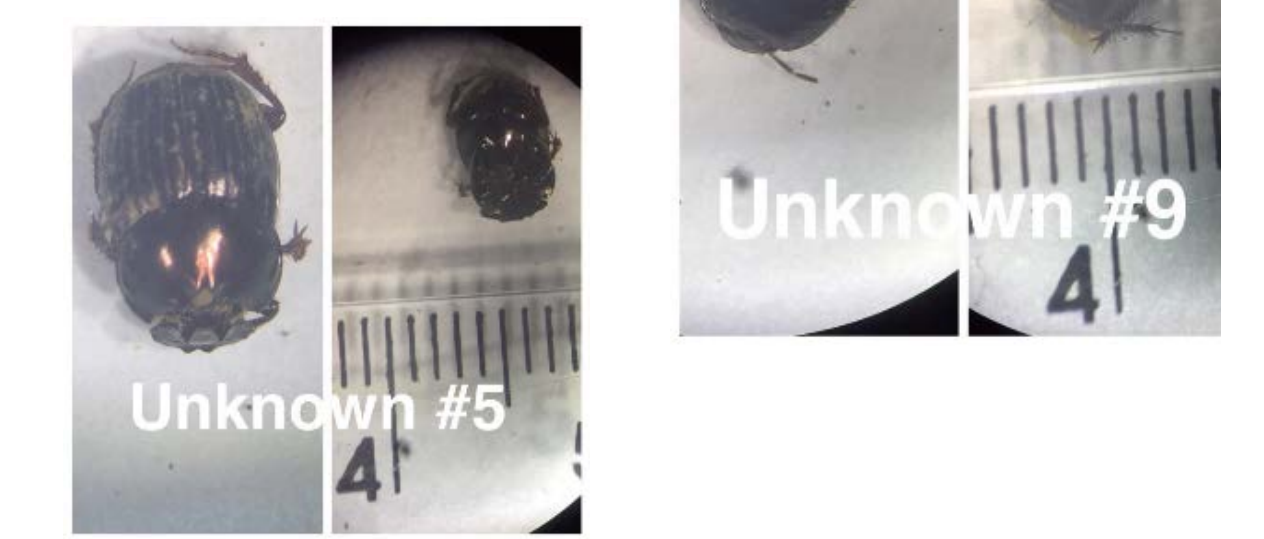
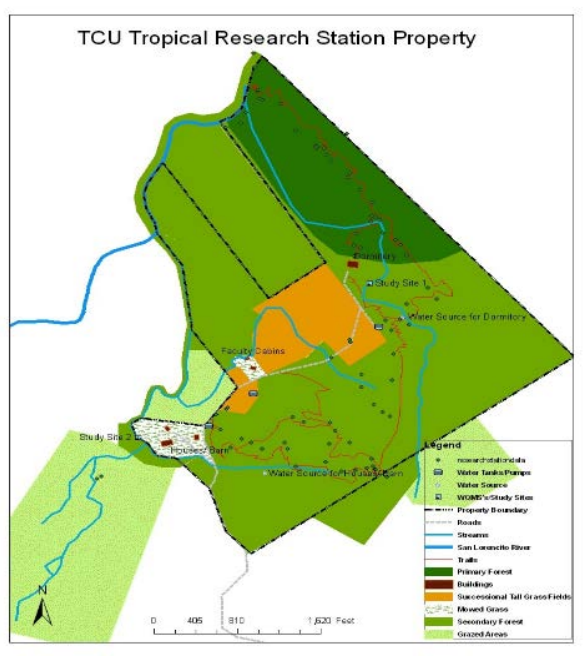


How our Spring Break went to Crap: Abundance and Diversity of Dung Beetles in a Neotropical Rainforest

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INTRODUCTION

- Dung Beetles are fairly common and can be found in many ecosystems throughout the globe.
- In recent years researchers have found them to serve as highly effective bioindicator species because of their broad availability in numerous ecosystems.
- Our study of dung beetle populations utilized modified pitfall traps baited with cow or horse excrement.
- Analysis of the data focused on the differences in species richness and abundance between primary and secondary forest populations.



METHODS

- We collected cow and horse excrement before conducting our experiment.
- Eight 64 oz. plastic containers were first filled with 2 inches of dirt and then filled to the top with cow excrement.
- 2 controls were made by filling the containers with only dirt.
- We then dug holes and placed each container flush with the ground 25 meters apart, 5 in both secondary and primary forest (Figure 1).
- The modified pitfall traps were allowed to sit for a 24 hour period before being collected.
- Processing of the excrement consisted of sifting through the samples with tweezers and a wire mesh.
- 70% Ethanol was used to sanitize and kill the beetles.
- Dung beetles were allowed to dry overnight before being analyzed.
- Trial 2 was conducted by substituting cow excrement with horse excrement.
- We then scrutinized all dung beetles found by counting, identifying, and analyzing our results.



Figure 1: Map of modified pitfall traps in primary forest (top) and secondary forest (bottom).

RESULTS

Table 1: Total and mean mass of dung beetles found in primary and secondary forest. Proportion of large to small beetles in both sites.

	Primary Forest Cow	Secondary Forest Cow
Total Mass (g)	4.51	2.81
Mean Mass (g)	0.042	0.014
Large/Small	0.355	0.041

Dung Beetle Data	Primary Forest Cow	Secondary Forest Cow
Total # of Beetles	107	196
Mean # of Beetles	26.75	48.5
# of large Beetles	28	8
# of Small Beetles	79	188
# of Morpho Species	4	4
Pinotus sp.	0	1
Aphodian sp.	79	188
Unknown #2	21	5
Unknown #5	6	2
Unknown #9	1	0

Table 2: Breakdown of the total number of beetles found into number of each species and number of large and small beetles collected in primary and secondary forest.

- We found significantly more dung beetles in secondary forest compared to primary forest (2-sample t-test: $t=2.15$, $DF=6$, $P=0.075$).
- Our T-value was found to be larger than the table value at $\alpha = 0.1$, thus we can say with 90% confidence that the results of our experiment were the result of the experimental treatment.

Table 3: Mean # of dung beetles found and standard error in each forest type.

Habitat	Mean # of beetles	Standard Error
Primary	26.75	5.023
Secondary	48.5	8.799

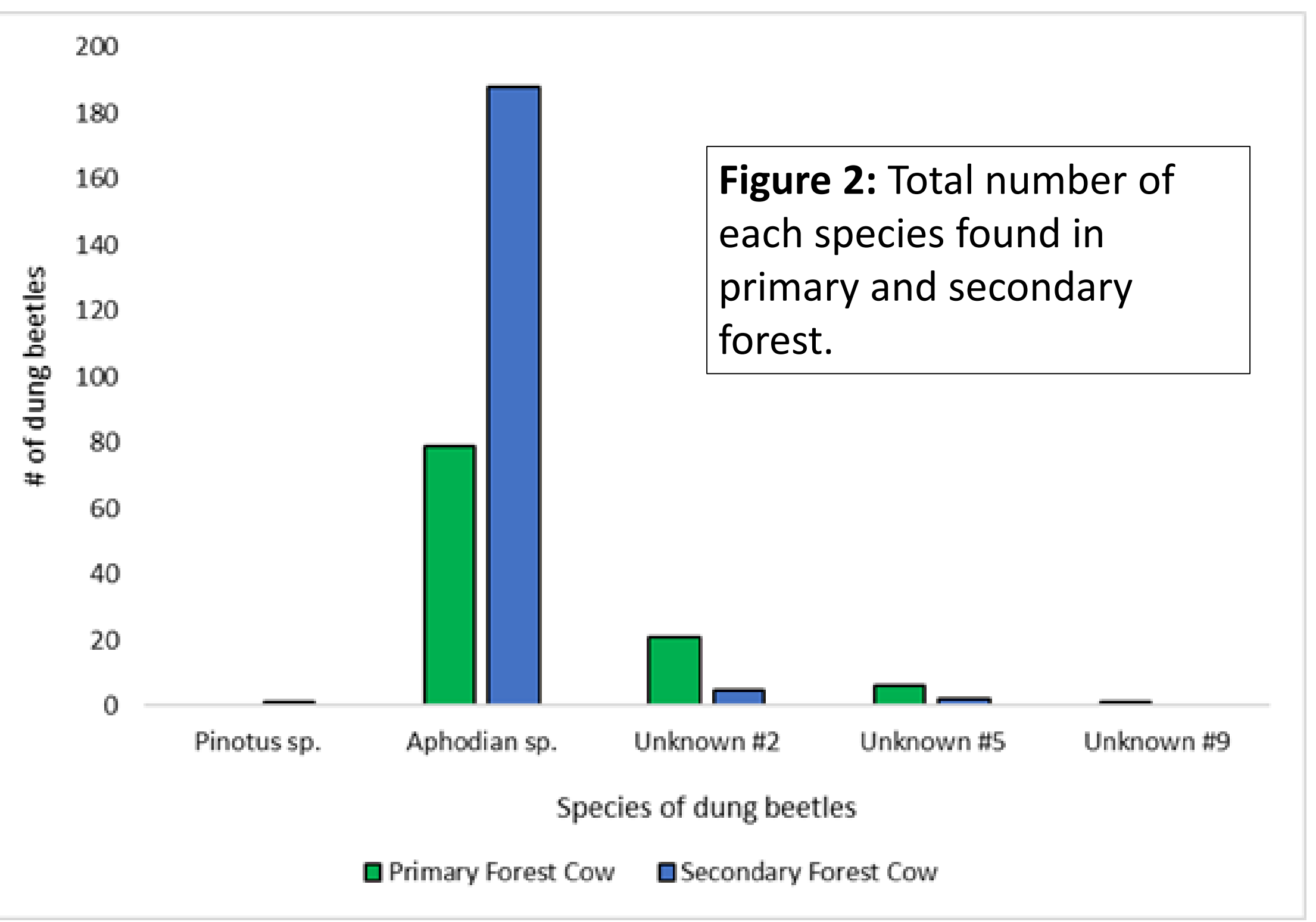


Figure 2: Total number of each species found in primary and secondary forest.

- We were only able to analyze our first 2 samples and the control of trial 2 in primary and secondary forest using horse excrement.
- No dung beetles were collected.

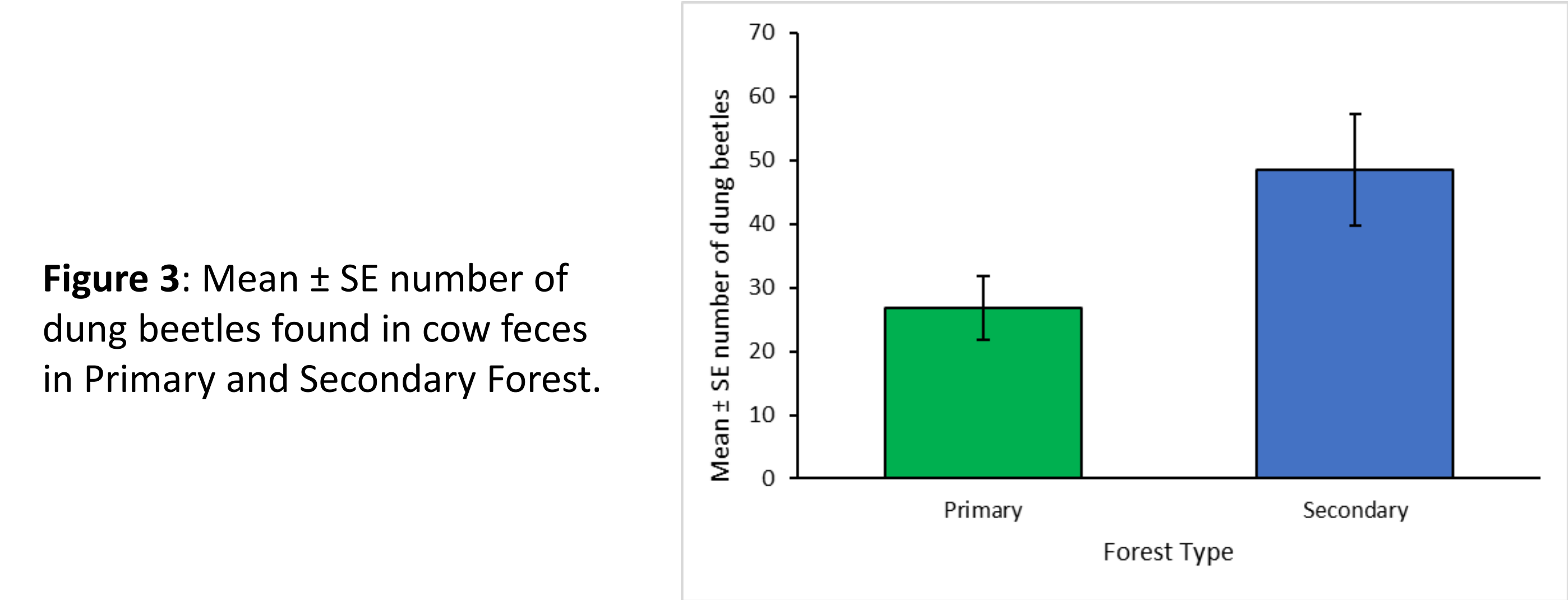


Figure 3: Mean ± SE number of dung beetles found in cow feces in Primary and Secondary Forest.

CONCLUSIONS

- Secondary forest was found to possess a greater abundance of dung beetles, with nearly twice as many beetles being found, contrary to previous studies which lead us to anticipate a greater number in primary forest.
- Species richness was found to be consistent in both environments, four species of dung beetles were found in each forest type, with a total of 5 species collected.
- Dung beetles collected in primary forest had a mean mass three times greater than that of beetles found in secondary forest (Table 1).
- The proportion of large to small beetles revealed a significant difference between the two populations of beetles with a far greater proportion of large dung beetles in primary forest compared to secondary forest (Table 1).
- Going forward, measurements of dung beetle mass should be used in conjunction with abundance and species diversity when using dung beetles as bioindicators for neotropical rainforests.

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