

Avian Visitation to Flowering Plants of La Selva, Costa Rica



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Introduction

Many birds, including hummingbirds are mutualists with specific species of plants. More than 7000 plant species rely on hummingbirds for pollination, and hummingbirds need floral nectar to fuel their fast metabolism. (Rodriguez-Flores et al., 2019) At La Selva Biological Station in Costa Rica, there are 26 different species of hummingbirds, which many plant species rely on for reproduction. There are two dominant avian-dependent flowering bushes, the Vervain Bush and the Scarlet Bush. Both plants are native to Central and South America. The Vervain Bush is a short flowering bush with small purple flowers that are 1/4 inch long and 1/2 inch wide, which attracts short billed hummingbirds. It grows around 4-6 feet tall and 2-3 feet wide. The Scarlet Bush is a tall flowering bush with long red flowers that are 1 inch long and 1/8 inch wide. It grows to a height and width of 8-12 feet and is known for attracting a larger variety of pollinator and seed disperser species. By monitoring avian visitation to these plants, we can get a better understanding of the relationship between the plants and their avian visitors.

Hypothesis

Alternative Hypothesis:

The two plant species will differ in diversity and quantity of avian visitation.

Null-Hypothesis:

The two plant species will not differ in diversity and quantity of avian visitation.

Methods

- Two ten-minute point counts were conducted on ten Scarlet and ten Vervain Bushes at La Selva Biological Station, Sarapiquí, Costa Rica on March 6th, 2023.
- Counts between the Vervain and Scarlet Bushes were alternated to control for weather and time of day.
- The number of total bird species observed, the Shannon Diversity Index, and Berger-Parker Dominance Index were calculated to measure avian species quantity, diversity, and dominance on each plant species.

Results

Vervain Bush:

- One House Wren and 22 Rufous-tailed Hummingbirds visited this plant species. (See Table 1 for more information)
- Total birds observed (N) = 23
- Number of species observed (S) = 2
- Shannon Diversity Index = 0.18
- Berger-Parker Dominance Index = 0.96

Scarlet Bush:

- 15 avian species visited this plant species. (See table 2 for more information)
- Total birds observed (N) = 47
- Number of species observed (S) = 15
- Shannon Diversity Index = 2.54
- Berger-Parker Dominance Index = 0.15

Vervain Bush Avian Visitation			
Bush #	Sample #	Bird Species	Number of Each Species
B1	1	Rufous-tailed Hummingbird	1
B4	1	Rufous-tailed Hummingbird	1
B2	1	Rufous-tailed Hummingbird	1
B3	1	N/A	0
B5	1	Rufous-tailed Hummingbird	3
B6	1	Rufous-tailed Hummingbird	2
B9	1	House Wren	1
B7	1	Rufous-tailed Hummingbird	2
B8	1	Rufous-tailed Hummingbird	1
B10	1	Rufous-tailed Hummingbird	3
B1	2	Rufous-tailed Hummingbird	1
B4	2	Rufous-tailed Hummingbird	2
B2	2	Rufous-tailed Hummingbird	1
B3	2	Rufous-tailed Hummingbird	1
B5	2	Rufous-tailed Hummingbird	1
B6	2	N/A	0
B9	2	Rufous-tailed Hummingbird	1
B7	2	N/A	0
B8	2	N/A	0
B10	2	N/A	0
Total			23

Table 1: Vervain Bush Avian Visitation Data Sheet.

Scarlet Bush Avian Visitation			
Bush #	Sample #	Bird Species Observed	Number of Each Species
R2	1	Blue-gray Tanager	2
R2	1	Olive-crowned Yellowthroat	1
R2	1	Bananaquit	1
R2	1	Black-and-white Warbler	1
R2	1	Rufous-tailed Hummingbird	1
R2	1	Crowned Woodnymph	1
R3	1	Chestnut-sided Warbler	1
R3	1	Rufous-tailed Hummingbird	1
R3	1	Black-and-white Warbler	1
R1	1	Rufous-tailed Hummingbird	1
R5	1	N/A	0
R6	1	N/A	0
R7	1	N/A	0
R8	1	N/A	0
R9	1	N/A	0
R10	1	N/A	0
R2	2	Olive-crowned Yellowthroat	1
R2	2	Chestnut-sided Warbler	1
R2	2	Black-and-white Warbler	1
R2	2	Summer Tanager	2
R2	2	Collared Aracari	1
R3	2	Rufous-tailed Hummingbird	2
R3	2	Ruby-throated Hummingbird	1
R3	2	Crowned Woodnymph	1
R1	2	Shining Honeycreeper	3
R1	2	Chestnut-sided Warbler	3
R1	2	Sulphur-rumped Flycatcher	1
R1	2	Green Honeycreeper	1
R1	2	Rufous-tailed Hummingbird	1
R1	2	Scarlet-rumped Tanager	2
R1	2	Crowned Woodnymph	1
R5	2	N/A	0
R6	2	Scarlet-rumped Tanager	1
R6	2	Green Honeycreeper	3
R6	2	Chestnut-sided Warbler	1
R6	2	Golden-hooded Tanager	2
R6	2	Shining Honeycreeper	3
R7	2	Rufous-tailed Hummingbird	1
R7	2	Crowned Woodnymph	1
R7	2	Dusky Flycatcher	1
R9	2	N/A	0
R8	2	N/A	0
R10	2	Rufous-tailed Hummingbird	1
Total:			47

Table 2: Scarlet Bush Avian Visitation Data Sheet.

Conclusion

The Scarlet Bush was visited by more birds of more species than the Vervain Bush. The Rufous-tailed Hummingbird appeared to be a specialist on the Vervain Bush. This data supports the alternative hypothesis.

The Scarlet Bush is taller and wider than the Vervain Bush. It produces berries as well as nectar rich flowers, attracting both pollinators and seed dispersers. The most common avian pollinators observed were the Rufous-tailed Hummingbird, Shining Honeycreeper, Green Honeycreeper, and the Crowned Woodnymph. The most common avian seed dispersers observed were the Chestnut-sided Warbler, Black-and-white Warbler, and the Scarlet-rumped Tanager.

Acknowledgements



Image 1: Flowering Scarlet Bush.



Image 2: Flowering Vervain Bush.

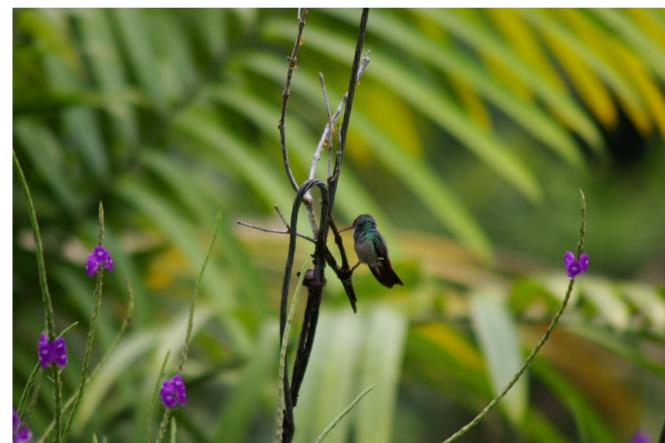


Image 3: Rufous-tailed Hummingbird on a Vervain Bush.