Biodiversity of non-Formicid Hymenoptera

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Abstract

The objective of this experiment was to measure biodiversity of non-formicid Hymenoptera between different habitats. Habitats compared consisted of a tropical deciduous forest with little disturbance, and a location adjacent to the Check Hall river with more regular human disturbance.

Introduction

Parasitic Hymenoptera are highly regarded among humans due to their predator/parasitic relationship with insects and other pests. Parasitic wasps in particular locate a host and turn it into a vessel in which its young can develop.

Hymenoptera can be broken down into two suborders: *Symphyta* and *Apocrita*. Each one of these suborder contains several superfamilies which in turn are divided into several families. The focus of this experiment will be the non-formicid Hymenoptera. That is, everything but the family containing ants.

This study was performed to compare the biodiversity of non-formicid Hymenoptera in varying habitats. The two environments compared were dense forest with little disturbance, and a second location by the Check Hall river at a much lower altitude. I hypothesize that due to the presence of water at site A there will be an increased number of different morphospecies at that site.

Materials and Methods

Two sites were selected to test whether habitat plays a role in biodiversity of Hymenoptera. Site A was located adjacent to the swimming hole on the Check Hall river, while site B was on Mt. Joy trail in dense tropical deciduous forest at 159m 15* 21.07 N by 61* 21.46 W. Traps at site A were set on May 24, 2003, while site B was set on May 28, 2003. Both sites were cleaned regularly until they were removed on June 4, 2003.

Each site contained an array of traps; one Malaise, one Flight Intercept, and six Yellow Pan traps. The Malaise and flight intercept traps were mounted between neighboring trees, and the pan traps were placed on the ground in the general area. To provide a preserving medium for trapped insects the yellow pan traps and the flight

intercept traps were filled with a soap, water, and salt mixture. The use of soap helps to reduce the surface tension of water, and the salt preserves the insects. On the other hand, the collection jar on the Malaise trap was filled with 95% alcohol solution.

After samples were collected, fine point forceps aided in the process of removing unwanted insects. Non-formicid Hymenoptera were placed in a vial labeled with location, traps, and date for future reference. Hymenoptera were sorted to morphospecies by looking at wing venation and characteristics of the legs, antennae, thorax, and abdomen. Finally, resulting wasps were compared within each site to determine the number of different morphospecies present.

Results

Site A collected a total of 115 non-formicid Hymenoptera, and site B ended up with 263. Different morphospecies at site A totaled 50, and the samples at site B contained 80 types. The Shannon Weaver diversity index for site A was 3.42996 and for site B 3.41761. Table 1 gives a list of unique wasps, and the numbers of individuals for each morph.

Discussion

Since the index values are extremely close for both sites, the hypothesis made can not be supported. A miniscule amount of difference in diversity, according to the index values produced, occurs between the two habitats. However, it is also evident from exmination of the raw data that site B was much more productive than site A. Site B ran four days shorter than the traps at site A, but collected 30 more morphospecies and twice the number of individuals.

Both sets of data are similarly skewed (Fig. 1). This is most likely a result in my inexperience in differentiating morphological characteristics of Hymenoptera. It is recommended that individuals doing future research in this area take the time to properly identify all specimens for comparison.

References

Borror; Triplehorn; Johnson. 1989. *An Introduction to the Study of Insects*. 6th ed. Saunders College Publishing, Ft. Worth; 665-744.

Myers, W; Shelton, R. 1980. *Survey Methods for Ecosystem Management*. Wiley-Interscience, New York; 289.

Table 1. Numbers of non-formicid hymenopteran morphospecies and their abundance at two different sites on the Springfield Plantation.

Site A

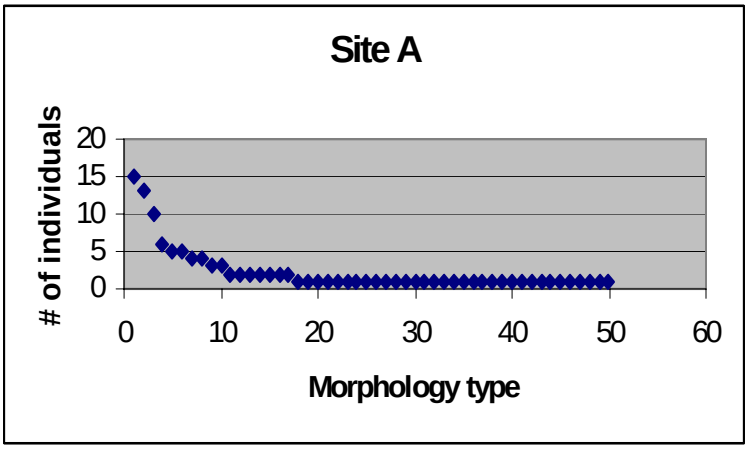
Type	#'s present
1	15
2	13
3	10
4	6
5	5
6	5
7	4
8	4
9	3
10	3
11	2
12	2
13	2
14	2
15	2
16	2
17	2
18	1
19	1
20	1
21	1
22	1
23	1
24	1
25	1

Site B

Type	#'s present	Type	#'s present
1	32	48	1
2	31	49	1
3	26	50	1
4	22	51	1
5	22	52	1
6	20	53	1
7	7	54	1
8	7	55	1
9	5	56	1
10	5	57	1
11	3	58	1
12	3	59	1
13	3	60	1
14	3	61	1
15	3	62	1
16	3	63	1
17	2	64	1
18	2	65	1
19	2	66	1
20	2	67	1
21	1	68	1
22	1	69	1
23	1	70	1
24	1	71	1
25	1	72	1

26	1
27	1
28	1
29	1
30	1
31	1
32	1
33	1
34	1
35	1
36	1
37	1
38	1
39	1
40	1
41	1
42	1
43	1
44	1
45	1
46	1
47	1
48	1
49	1
50	1
	115

26	1	73	1
27	1	74	1
28	1	75	1
29	1	76	1
30	1	77	1
31	1	78	1
32	1	79	1
33	1	80	1
34	1	Total	230
35	1		
36	1		
37	1		
38	1		
39	1		
40	1		
41	1		
42	1		
43	1		
44	1		
45	1		
46	1		
47	1		



Figures 1. Numbers of individuals/species of non-formicid Hymenoptera