

Visitation of Heliconius to Cnidoscolus urens ("Mala Mujer")

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Introduction

We originally hoped to study the correlation between visitation rates of Heliconius butterflies and nectar production of the plant, Cnidoscolus urens. We, secondly, wanted to make cross-pollinations by hand to see if there were differences in the production of pollen tubes as a function of distance from the parent plant. However, there were no measurable amounts of nectar produced in either the morning or the evening, and due to a highly skewed sex ratio (Table 1), it was very difficult to locate female flowers for hand pollinations. Several female flowers were removed and the inflorescence was bagged late in the evening the day before observations were made on visitations. Unfortunately, no female flowers opened the next day to replace these, and it was therefore not possible to conduct the cross pollination studies. Our study therefore focused on the visitors to Cnidoscolus urens.

Methods and Results

Three stands of Cnidoscolus were selected, each at a distance of thirty meters from the next patch. In order to determine the amount of movement between the patches, we used rapidographs to mark a total of 26 Heliconius of one species which appeared to be pollinating the plant, and 21 of a second Heliconius species which was not observed to visit the flowers. A total of 6 recaptures were made within a patch, ranging from 1 minute to 2 hrs 35 min from the time of first capture. One recapture was made between the patches 1 hr 15 min from the time of first capture.

Following is a list of visitors, with times of observed visits:

- 7:15 AM Small bee
- 7:30 AM 2 Heliconius species. The species not observed to visit the flowers was observed at fairly regular intervals, approximately every half hour, from 7:30-11:00 AM. The other Heliconius species was apparently a pollinator of Cnidoscolus urens, as significant amounts of pollen were removed with a capillary tube from the proboscis of a number of these butterflies, and they were observed to visit both male and female flowers. This Heliconius species visited from 7:30-9:00 AM, was absent from 9:00-10:30 AM, and then continued its visits from 10:30-11:00 AM, during the last half hour of our morning sample.
- 9:00-10:30 AM Six unidentified species of butterflies were observed to visit during this time period; 4 of these species were observed to visit within a seven minute period at one patch. Their visits when Heliconius was absent may indicate the existence of competition between the pollinators for Cnidoscolus nectar
- 2:00 PM Large fly
- 11:00 PM Moth

There were significant differences in the number of visitors to the different patches, which was probably a function of both the amount of sunlight and the size of the patch. The following data on captures of Heliconius species indicate some of the trends.

	Patch #1 (medium size, medium shade)	Patch #2 (large size, mostly sun)	Patch #3 (small size, shaded)
<u>Heliconius</u> sp. 1*	5	15	6
<u>Heliconius</u> sp. 2*	10	0	11

(Heliconius sp 1 is presumed pollinator; H. sp. 2 is non-visitor).

Discussion

It appears that the Heliconius butterflies tend to use one patch of flowers rather than move between patches. This may be related to micro-habitat preferences. There also appears to be temporal variation in visitation by Heliconius and other pollinators, which may reflect differences in preferred activity patterns of the pollinators, or unobserved differences in substances produced by the plant.

It would be interesting to conduct a more long-term study of this plant to determine the nature of flower production. On the basis of this short study, it is not possible to say if there is an early production of mostly female flowers, or if male flowers are constantly produced. Given the large number of fruits, it is likely that this monoecious plant outcrosses by separating the time of production of male and female flowers.

Table 1. Sex ratios of flowers of Cnidocolus urens, July 12, 1981.

Plant	Height	Width	# Branches	# male flowers	# female flowers	# fruits
1	145	130	4	35	4	121
2	170	140	2	23	0	61
3	90	110	3	12	0	-
4	145	95	3	13	2	27
5	122	88	3	4	1	18
6	140	70	1	6	0	9
7	130	170	5	40	3	58
8	140	170	4	42	0	64
9	90	100	4	6	0	13
10	90	70	1	5	0	8
11	120	150	5	61	3	100
12	132	210	2	8	0	14
13	140	200	3	91	2	136
\bar{X}	127	115	3.08	26.62	1.15	41.08