Herpetofauna Density in Dominica

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Abstract

For approximately three weeks, herpetofauna density was measured in several different habitats across Dominica. Various environmental conditions were recorded as the density surveys were conducted, such as temperature, elevation, and canopy cover. Each of these factors was used to deduce distribution patterns of various herpetofauna that was encountered.

Introduction

Dominica is known as the "The Nature Island of the Caribbean." The island is rich in biodiversity with an abundant number of species. The high diversity of plant species creates a supportive environment for an abundant amount of herpetofauna.

To conduct our research, different environments observed were Cabrits national park, and Batali Beach, which are on the north side of the island, and in and around Springfield, which is the south west part of the island.

The purpose of this project was to collect herpetofauna density data and compare densities in these environments. The environment around Springfield is lush and humid due to the large amounts of rain that fall here, whereas Cabrits and Batali Beach are drier due to the fact that less rain falls in these habitats. These two environments help to shape the habitats that suit different herpetofauna species.

The herpetofauna of Dominica includes the tink frog (*Eleutherodactylus martinicensis*), the mountain chicken (*Leptodactylus fallaxi*), the Johnstone's whistling

frog (*Eleutherodactylus johnstoneii*), the ground lizard (*Ameiva fuscata*), the Dominican Anole (*Anolis fuscata*), and skink (*Mabuya bistriata*) (Evans and James, 1997).

Materials and Methods

Data were gathered around various habitats in Dominica from May 29 to June 10. At Springfield including the Mt. Joy trail sixteen 50 m transects were set. Five meters were measured on a rope and used to measure 50 m transects. Each transect was marked with orange flagging tape at 0 m, 25 m, and 50 m. A period of time ranging from ten minutes to a day was allowed to reduce disturbance.

Eight transects were set up along the Mt. Joy trail at varying levels of elevation. Four transects were set up around the guesthouse and the stream house, and four transects were set up going down the trail to the Check Hall River.

On May 28, at Batali Beach and Cabrits, a more efficient method was used due to time constraints. One group member walked a distance of 50 m, which equaled 75 steps. The group walked two by two along the transect line to count all of the scattering herpetofauna. Eight transects were set at Cabrits, and six transects were set at Batali Beach.

The habitat was noted in each transect. Temperature was recorded when possible with a Kestrel 3000. The compass bearing and elevation were recorded with a GPS system when the signal was available and a topographical map when the signal was not available.

Results

Table 1 shows habitat description, elevation, and compass bearings for transect T1 through T16. Table 2 and 3 show morning and afternoon times of readings respectively, herpetofauna tallied, and observations for transects T1 through T16. Tables 4 and 5 show data from Batali Beach and Cabrits National Park, respectively. These tables show herpetofauna counted, descriptions of each habitat, compass bearing and elevation.

In some transects, the term semi-closed canopy was used to describe the physical description of the environment where there was cover from treetops but not enough to offer full shade.

Discussion

According to the data, the climate seems to shape which herpetofauna were more common in certain environments. Tink frogs need an environment that helps them retain their moisture. They were frequently observed in cooler, wetter climates, such as Springfield Plantation and Mt. Joy area. Ameivas and skinks were more common in drier environments, including Batali Beach and Cabrits. A grove snake (*Alsophis antillensis*) was captured on one of the transects at Batali Beach, and another was observed at Cabrits, so they may also prefer drier areas. This is because ameivas, skinks, and grove snakes may need warmer and drier climates to maintain their body temperature. Finally, anoles seemed to prefer areas with high or low rainfall and temperatures in the mid thirties. At this range, anoles may be able to efficiently minimize heat lost without overheating.

Although we could find no pattern in the compass bearings, elevation also seemed to play a role in herpetofauna distribution. For instance, tink frogs were observed more often at higher elevations. We noted that leaf litter including large leaves, such as *Cecropia*, also occur at higher elevations, so tink frogs may use those leaves along the forest floor as protection from predators, high temperatures, and moisture loss. Anoles however, were more regularly recorded at lower elevations. This may be because the anoles' prey may utilize those same large leaves for protection, so they choose their habitats in areas where their prey can't hide as easily. Note that Ameivas, grove snakes and skinks were more common at even lower elevations. However, we suspect that the Ameivas and skinks were more drawn to warm, dry climates which happened to be at low elevations.

Canopy cover also factored in herpetofauna distribution. We found that tink frogs in our transects roosted exclusively in closed canopy areas. Maybe this is because the closed canopy further provides protection against predators, heat, and dehydration. Anoles also prefer closed canopy or occasionally semi-closed canopy. It's possible that anoles need closed canopy to avoid predators and only require semi-closed canopy to sun themselves. Curiously enough, Ameivas and skinks favor open canopy areas (though they will select semi-closed and closed canopy as well). However, given their size, Ameivas probably do not have to worry as much about predators, and they may require more sun to maintain thermoregulation. Skinks may also require open canopy to meet thermoregulation demands, despite the risk of predation. Unfortunately, we cannot construct any sound conclusions for the pattern of canopy cover in grove snakes since we only saw one.

Finally, the time of day also played a role in herpetofauna distribution. Although tink frogs were common in the morning, they were slightly more active in the afternoon. Perhaps tink frogs are more common in the afternoon because that is when they are hunting their prey. Anoles were also more often spotted in the afternoon. We suspect that this is when anoles are no longer sunning themselves and have also started searching for food. Unfortunately, we can not make any strong conclusions on time for Ameivas and skinks since they were more frequent in Batali Beach and Cabrits, and we were at those locations only once.

One thing we would do differently is bring another Kestrel so we can take more temperature readings when the group splits up to survey transects. We also would have preferred more chances to survey areas like Batali Beach and Cabrits to further investigate their herpetofauna distribution patterns, especially in the morning and the afternoon. Finally, we also would have like to spot an *Anolis cristellus*, an introduced species in Dominica, to look into their distribution patterns.

References

Evans, Peter G.H. and Arlington James. Dominica Nature Island of the Caribbean. Ministry of Tourism, Roseau Commonwealth of Dominica. 17, 20.

Tables

Table 1: Transect Physical Description			
	Habitat Description	Elevation (m)	Compass Bearing
Transect 1	Open canopy, agriculture garden	327	15 N 20.808 min
			61 W 22.153 min
Transect 2	Closed canopy, open grassland leading to a house	326	15 N 20.806 min
			61 W 22.159 min
Transect 3	Closed canopy, trail down to stream, secondary forest	327	15 N 27.81 min
			61 W 22.149 min
* Transect 4	Closed canopy, secondary forest	284	15 N 27 min
			61 W 22min
* Transect 5	Semi open canopy, down stream	279	15 N 27 min
			61 W 22 min
Transect 6	Semi open canopy, up stream	279	15 N 27.81 min
			61 W 22.132 min
* Transect 7	Open canopy, agricultural	329	15 N 35 min
			61 W 28min
* Transect 8	Closed canopy, Mount Joy Trail entrance, agricultural	330	15 N 35 min
			61 W 28min
* Transect 9	Closed canopy, agricultural	341	15 N 35 min
			61 W 28min
* Transect 10	Closed canopy, agricultural, staircase	342	15 N 35 min
			61 W 28min
Transect 11	Closed canopy, agricultural	423	15 N 20.881 min
			61 W 21.924 min
* Transect 12	Closed canopy, agricultural	430	15 N 35 min
			61 W 28min
* Transect 13	Closed canopy, agricultural	435	15 N 35 min
			61 W 28min
* Transect 14	Closed canopy, agricultural	440	15 N 35 min
			61 W 28min
* Transect 15	Closed canopy, agricultural	457	15 N 35 min
			61 W 28min
* Transect 16	Semi canopy, disturbed area, Springfield parking lot	329	15 N 35 min
			61 W 28min
* Readings from topographical map			

Table 2: Morning Herpetofauna Reading							
	Time	Anole	Grove Snake	Tink Frog	Skink	Ameiva	Observations
Transect 1	9:25	0	0	0	0	0	Light rain showers
	10:28	0	0	0	0	0	rained 2 consecutive days, 31.2 C
	10:30	0	0	0	0	0	Hazy, cloudy, some rain, 32.6 C
Transect 2	a 9:30	0	0	0	0	0	Light rain showers
	10:23	0	0	0	0	0	rained 2 consecutive days, 29.31 C
	10:35	0	0	0	0	0	Hazy, cloudy, some rain, 31.0 C
Transect 3	a 9:35	0	0	0	0	0	Light rain showers
	10:53	0	0	0	0	0	rained 2 consecutive days, 41.0 C
	9:30	0	0	0	0	0	Hazy, cloudy, some rain, 32.1 C
Transect 4	a 9:40	0	0	0	0	0	Light rain showers
	10:59	1	0	2	0	0	rained 2 consecutive days, 34.8 C
	9:40	0	0	0	0	0	Hazy, cloudy, some rain, 32.7 C
Transect 5	a 9:45	2	0	0	0	0	Light rain showers
	n/a	n/a	n/a	n/a	n/a	n/a	Water too high
	10:10	2	0	0	0	0	Hazy, cloudy, some rain, 31.9 C
Transect 6	a 9:50	0	0	0	0	0	Light rain showers
	n/a	n/a	n/a	n/a	n/a	n/a	Water too high
	9:53	0	0	0	0	0	Hazy, cloudy, some rain, 32.5 C
Transect 7	a 9:55	0	0	0	0	0	Light rain showers
	10:32	0	0	0	0	0	rained 2 consecutive days, 34.1 C
	9:25	0	0	0	0	0	Hazy, cloudy, some rain, 29.5 C
Transect 8	9:49	0	0	0	0	0	Light rain showers
	10:50	1	0	1	0	0	No rain, muddy
	11:51	0	0	0	0	0	Hazy, cloudy, some rain
Transect 9	9:55	0	0	0	0	0	Light rain showers
	10:55	0	0	0	0	0	No rain, muddy
	11:48	0	0	0	0	0	Rain all morning
Transect 10	10:00	0	0	0	0	0	Light rain showers
	11:00	0	0	0	0	0	No rain, muddy
	11:45	0	0	0	0	0	Rain all morning
Transect 11	10:14	0	0	0	0	0	Light rain showers
	11:10	1	0	0	0	0	No rain, muddy
	11:38	0	0	0	0	0	Rain all morning
Transect 12	10:22	0	0	0	0	0	Light rain showers
	11:15	1	0	6	0	0	No rain, muddy
	11:35	0	0	2	0	0	Rain all morning
Transect 13	10:27	1	0	1	0	0	Light rain showers
	11:20	0	0	12	0	0	No rain, muddy
	11:28	1	0	2	0	0	Rain all morning
Transect 14	10:34	0	0	5	0	0	Light rain showers
	11:25	0	0	6	0	0	No rain, muddy
	11:17	0	0	1	0	0	Rain all morning
Transect 15	10:48	0	0	3	0	0	Light rain showers
	11:30	1	0	2	0	0	No rain, muddy
	11:08	2	0	4	0	0	Rain all morning
Transect 16	10:10	0	0	0	0	0	rained 2 consecutive days, 33.2 C
	10:18	0	0	0	0	0	rained 2 consecutive days, 28.4 C
a – approximately							

Table 3: Afternoon Herpetofauna Reading at Springfield and Mt. Joy							
	Time	Anoles	Grove Snake	Tink Frog	Skink	Ameiva	Observations
Transect 1	1:10	0	0	0	1	1	Just rained
	3:12	0	0	0	0	0	Overcast, damp ground, 32.2 C
	4:00	0	0	0	0	0	Overcast, damp ground, 37.1 C
Transect 2	1:15	0	0	0	3	0	Just rained, fresh cut grass
	3:15	0	0	0	0	0	Overcast, damp ground, 35.9 C
	4:04	0	0	0	0	0	Overcast, damp ground, 42.1 C
Transect 3	1:19	0	0	0	0	0	Just rained, 36.8 C
	3:30	0	0	0	0	0	Overcast, damp ground, 33.7 C
	3:56	0	0	0	0	0	Overcast, damp ground, 38.2 C
Transect 4	1:22	2	0	2	0	0	Just rained, 37.5 C
	3:37	0	0	2	0	0	Overcast, damp ground, 36.6 C
	3:51	1	0	4	0	0	Overcast, damp ground, 36.6 C
Transect 5	1:46	3	0	0	0	0	Just rained, 36.2 C
	3:40	0	0	0	0	0	Overcast, damp ground, 37.2
	3:45	1	0	0	0	0	Overcast, damp ground, 39.5
Transect 6	1:34	0	0	0	0	0	Just rained, 37.6 C
	3:40	0	0	0	0	0	Overcast, damp ground, 37.2 C
	3:46	0	0	0	0	0	Overcast, damp ground, 39.7 C
Transect 7	1:27	0	0	0	0	2	Just rained
	3:20	0	0	0	0	0	Overcast, damp ground, 37.7 C
	4:00	1	0	0	0	0	Overcast, damp ground, 37.1 C
Transect 8	1:12	0	0	0	0	0	Off and on showers 34.4 C
	2:15	0	0	0	0	0	Light rain showers
	11:45	1	0	1	0	0	Wet ground, no rain
Transect 9	1:18	0	0	0	0	0	Off and on showers 36.2 C
	a 2:20	0	0	0	0	0	Light rain showers
	a 11:50	0	0	0	0	0	Wet ground, no rain
Transect 10	1:20	0	0	0	0	0	Off and on showers
	a 2:25	1	0	0	0	0	Light rain showers 39.5 C
	a 11:55	0	0	1	0	0	Wet ground, no rain
Transect 11	1:24	0	0	0	0	0	Off and on showers 36.4 C
	a 2:30	0	0	0	0	0	Light rain showers
	a 12:00	0	0	0	0	0	Wet ground, no rain
Transect 12	1:29	2	0	2	0	0	Off and on showers 39.4 C
	a 2:35	0	0	5	0	0	Light rain showers
	a 12:05	0	0	3	0	0	Wet ground, no rain
Transect 13	1:35	0	0	3	0	0	Off and on showers 34.5 C
	a 2:40	0	0	7	0	0	Light rain showers
	a 12:10	0	0	4	0	0	Wet ground, no rain
Transect 14	1:50	0	0	3	0	0	Off and on showers 36.5 C
	a 2:45	0	0	11	0	0	Light rain showers
	a 12:15	1	0	7	0	0	Wet ground, no rain
Transect 15	2:07	0	0	5	0	0	Off and on showers 33.6 C
	3:15	5	0	17	0	0	Light rain showers
	a 12:20	1	0	7	0	0	Wet ground, no rain
Transect 16	1:20	0	0	0	0	0	Off and on showers
	3:08	0	0	0	0	0	Overcast, damp ground, 32.6 C
	4:09	0	0	0	0	0	Overcast, damp ground, 40.9 C

Table 4: Batali Beach Morning Transects

	Anole	Ameiva	Grove Snake	Skink	Iguana	Tink Frog	Habitat Description	Compass Bearing	Elevation (m)
Transect 1	0	14	0	0	0	0	Dense, dry, open canopy, 33.4 C	15 N 27 min - 61 W 27 min	0
Transect 2	0	12	0	0	0	0	Coastline, dry, open canopy, 29.3 C	16 N 27 min - 61 W 27 min	0
Transect 3	0	9	0	0	0	0	Shrubs, dry, semi-closed canopy, 38.9 C	17 N 27 min - 61 W 27 min	1
Transect 4	1	7	0	1	0	0	Open trail, semi closed canopy, 38.9 C	18 N 27 min - 61 W 27 min	1
Transect 5	0	18	0	2	0	0	Dense agricultural, open canopy 41.0 C	19 N 27 min - 61 W 27 min	1
Transect 6	1	16	1	1	0	0	Dense agricultural, closed canopy, 40.4 C	20 N 27 min - 61 W 27 min	2

Table 5: Cabrits National Park Afternoon Transects

	Anole	Ameiva	Grove Snake	Skink	Iguana	Tink Frog	Habitat Description	Compass Bearing	Elevation (m)
Transect 1	4	0	0	0	0	0	Closed canopy, woodland, 37.5 C	15 34.94 N – 61 28.37 W	30
Transect 2	0	0	0	3	0	0	Closed canopy, woodland, 42.3 C	15 35.04 N – 61 28.45 W	33
Transect 3	0	0	0	2	0	0	Closed canopy, woodland, 40.5 C	15 35.08 N – 61 28.47 W	35
Transect 4	0	0	0	3	0	0	Closed canopy, woodland, 36.4 C	15 35.01 N – 61 28.47 W	37
Transect 5	0	0	0	0	0	0	Closed canopy, woodland, 36.6 C	15 35.02 N – 61 28.46 W	24
Transect 6	0	0	0	0	0	0	Semi closed canopy, disturbed, 36.5 C	15 35.06 N – 61 28.38 W	23
Transect 7	2	0	0	2	0	0	Semi closed canopy, disturbed, 36.5 C	15 35.04 N – 61 28.38 W	22
Transect 8	2	0	0	0	0	0	Closed canopy, woodland 36.9 C	15 35.07 N – 61 28.35 W	22