A Photographic Field Guide to the Spiders of Dominica, West Indies

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Abstract

This is a field guide to the indigenous spiders of Dominica, West Indies that was created by collecting, identifying, and photographing spiders found at the Archbold Tropical Research and Education Center and neighboring areas. Included are twenty species from ten different families. Also, a general description of the morphology and behavioral traits of each specimen is provided along with the location in which each was found.

Introduction

The lush rainforest on the island of Dominica is an ideal habitat for a vast array of insects which thrive on the island's abundant resources. In turn, the moist environment and surplus of niches and food provides an equally suitable environment for species of predatory arthropods which prey upon such insects, more specifically spiders.

While residing at the Archbold Tropical Research and Education Center in Dominica for three weeks I performed a study on these spiders to try and effectively document the various species found on the island and create a field guide to aid those who wish to pursue further studies on these arachnids. This project was a continuation of the work of former study abroad student Lauren Ward (Dominica 2007) and her project titled Habitat Specificity of Selected Spiders of Dominica. A wide assortment of habitats such as elfin forest, montane forest, rain forest, seasonal forest, littoral woodland, and dry scrub woodland were explored on the island in order to achieve maximum diversity in the field guide.

Materials and Methods for Collecting

Before arriving in Dominica I performed a small investigation of the indigenous spiders of the island. This included reading online research journals on previously studied arachnids found in Dominica as well as the United States, becoming familiar with projects written by the previous Dominica Study Abroad students, and refreshing myself on the general characteristics and morphology of spiders in general. One book that I frequently found myself referring to was A Field Guide to Spiders and Scorpions of Texas (1997) which is a small field guide to the more common spiders in the area. With all this preparation beforehand I knew what to expect in looking for spiders and more importantly I knew which habitats to search for specific spiders.

Once at Archbold Tropical Research and Education Center, ATREC, the hunt began for my first spider. Because the goal was to produce a field guide rather than perform an experiment, no exact procedure carried out in the actual collecting process. Methods in retrieving spiders were based merely on the chance of spotting and grabbing them rather than a strict trapping or gathering technique in which one would need to keep track of areas searched to prevent error in an experiment. This was also convenient in that others were able to contribute to the collecting effort by spotting and catching spiders for me. In a way it was like having twenty sets of eyes in the rainforest.

My preferred and the seemingly most effective method of capture was aspirating the spider right out of its web or niche. A vial was attached to a stopper with two metal tubes coming from either side. Rubber tubing is then attached to one of the metal tubes which is used similarly to a straw. A screen on the other metal tube prevents insects a debris from going all the way through to the other side as specimens are sucked into the vial. This way risk of injury both to myself and to the fragile specimen were limited due to the lack of physical contact in the capturing process. Also, in this way it was easier to catch the spiders before they were able to scurry either up their web where they were unreachable or down into the brush where it was literally impossible to find them again. At the same time the spiders were caught I quickly noted the details of where they were found for future reference in describing habitats and in some cases for ease in identification from a picture key with a general habitat already included.

Another form of spider capture that I used was pitfall traps. For these a small, plastic cup was rigged with a wire handle and filled with and inch environmentally friendly antifreeze. The entire cup was then buried in the ground in a way that the rim of the cup was level with the ground. Then an object, such as a rock or bunch of leaves, was placed over the opening of the cup to allow for a subtle cover up and hopefully appeal to the insects and spiders in their search for shelter. The idea is that the spider will come along looking for shelter, fall into the cup full of antifreeze and, unable to climb out, will drown. In order to ease the process of recovering of the traps in the days to come I marked each of the five traps I set with red, biodegradable tape. This was especially helpful after the heavy rains that washed brush onto the trap location and made it virtually unrecognizable and difficult to find it again. Despite all the effort put into setting the pitfall traps, this proved to be the least effective technique in catching arachnids. In fact, out of five traps set on the trails surrounding ATREC and left for five days only one spider was caught.

A third collecting method that was a bit more successful was Malaise trapping. A large net structure was stretched across the Check Hall River and in the densely vegetated areas and a collection bottle was then filled with 95% alcohol and attached to the top where insects would crawl or fly up into the trap. Instead of setting my own I was able to take advantage of the fact that other student projects at ATREC required this kind of trap to catch different flying

and arboreal insects. I would simply collect the discarded spiders out of their Malaise samples and take note on the area in which the trap was set. This method was slightly more fruitful than the pitfalls but still I found other strategies more worthwhile.
Manual collection with a kill jar was where I found the greatest success. A jar with Plaster of Paris pre-poured in the bottom was soaked with a few drops of ethyl acetate. I then ventured around ATREC and knocked the spiders out of their webs and into the jar. This technique was also convenient on our hikes to Middleham Falls, Boeri and Freshwater Lake, and Boiling Lake. Once in the jar, the ethyl acetate fumes acted as a killing agent and the spiders died of asphyxiation. This strategy was also beneficial in that I didn't have to transport multiple vials everywhere we went and once I returned to ATREC the spiders could be easily transferred to separate vials of 95% alcohol for preservation.

Materials and Methods for Photographing

Once all my specimens had been collected and placed in alcohol they were each separately photographed for documentation with the help of Dr. James Woolley. We used a Nikon D1x digital camera with a 100 mm f4 lens, 55 mm of extension and an SB-800 Nikon Flash. Exposures were made using TTL Flash and ISO 125. The benefit of using a digital camera instead of one with film is that once the picture is taken the computer can display the exact exposure that was captured so that the appropriate adjustments can be made to achieve better lighting depending on how the exposure graph is off center.

For the smaller species of spiders I used featherweight forceps to transfer the specimens to a watch glass dish filled with alcohol which was placed above a blank, white sheet of printer paper. The process of photographing was made complicated because of the reflection of the flash on the alcohol's surface which resulted in white spots in the picture where a leg or other body part would stick out of the alcohol. Even more frustrating was the tendency of the subject to float in the alcohol and drift to the side of the dish. The spider was then centered in the dish and lined up in the frame of the camera. Even with the high tech digital photography of the Nikon D1x it was difficult to achieve maximum focus on their delicate legs and body patterns. My smallest specimen, at one millimeter in length, was the most difficult of all to photograph and much effort was made in adjusting the lighting and flash to capture its intricate designs and eye patterns for later identification. For each spider at least two pictures were taken from different angles. Because the eyes are one of the key features scientists look at the dorsal view was most important. We also took shots of the ventral view and the side view when possible to compare the body shape to the picture keys.

As the photography session progressed from the smaller species to the larger ones it became much easier to manipulate the spiders' bodies for clearer pictures and better exposure with the flash. They were placed and centered in a large Petri dish of alcohol. Larger spiders were significantly less problematic because they had less of a tendency to float in the alcohol since they had greater body weight to keep them still. In order to accommodate the bigger bodies and greater leg length we had to switch out the lens to a smaller one and adjust the height of the camera so that the spider would fit completely in the frame. At times the dark coloration of the spider made it difficult to see the detailed features of the body, especially the eyes. This problem was resolved by adjusting the stops on the camera to higher settings for brighter reflection off the specimen.

Afterward all the pictures were photo shopped by Dr. Woolley and cropped small enough to fit into a word document. Then they were placed onto a 2 GB flash drive for transfer. Then began the long process of spider identification via microscope by looking at the eyes, body shape, and size and comparing that information to the collaborated data in the How to know the Spiders(1978) pictured key.

Results

Overall, twenty species from ten different families were obtained and documented. Below, pictures, general identification facts, and behavioral traits for all of the specimens are provided for reference out in the field. Each of the spiders are with their pictures are alphabetized and organized into their corresponding families.

Family: Araneidae

Figure 1: Unidentified *Araneus* sp. Found at ATREC in small web on railing. This spider creates a funnel type hideaway within a crevice and when disturbed will retreat to this area. Species can be identified by its rounded abdomen and mottled coloration.

Figure 2.1-2.2: female *Cyclosa turbinate* found on bamboo near ATREC. Species collects prey and shed skin and places it in a vertical line in the center of the web. The abdomen is shaped and colored in a way to camouflage within this web. When disturbed, this spider will fall to the ground while retaining a web to climb back to resting position.

Figure 3.1-3.2: small *Argiope argentata* found in Carib Territory with web on lower vegetation. Its web was located a few inches from that of another spider seen in **Figure 4.1-4.2.**

Figure 4.1-4.2: female *Argiope argentata* found in Carib Territory. Its Web, which was located on the ground, was six inches across with an X design in the center where the spider rested. This female was accompanied by two other *Araneus* sp. that are believed to be males of the same species. One of the males can be seen in **Figure 5.1-5.2.**

Figure 5.1-5.2: believed to be a male *Argiope argentata* which was found in the same web as a large, female *Argiope argentata.* It is known to be a male because of the large red pedipalps.

Figure 6.1-6.2*:* female *Gasteracantha cancriformis*. This spider was found in a web which was about four feet off the ground and in a tree. Many times this species live with multiple webs around the same area, maybe a foot apart. Most of the webs that I located were generally the same height off the ground. This

species can be recognized by its bright orange and white coloration and four spikes on the abdomen.

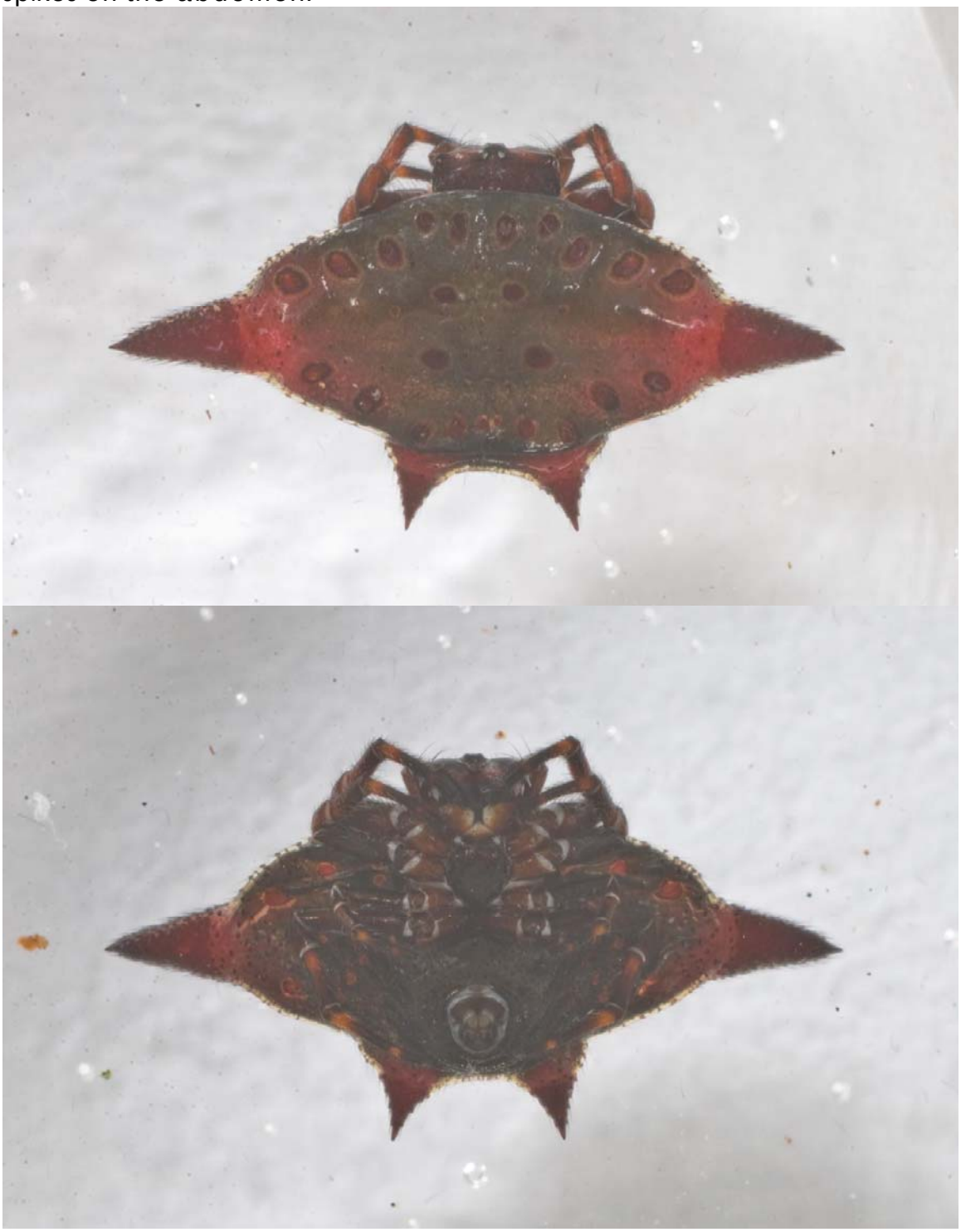

Figure 7.1-7.2: female *Gasteracantha* sp. similar to the *cancriformis* species. However this species had different patterns of coloration on the abdomen and thicker, more curved spikes when viewed head-on.

Figure 8.1-8.2: female *Gasteracantha sp.* which is much less common than the *cancriformis* species featured in **Figure 6.1-6.2.** It can be distinguished by the two prominent spikes on the abdomen and two lesser prominent spikes seen in the dorsal view.

Family:
Lycosidae

Figure 9.1-9.2: Unidentified *Lycosid* sp. which was found on the ground near Middleham Falls. Specimen was found missing one leg on the left side.

Family:
Lyssomanidae

Figure 10.1-10.2: Believed to be *Lyssomanes viridis* which is very similar to the jumping spider. This specimen was found in an aerial Malaise trap hanging in a

tree near ATREC. The original coloration was very bright green. This specimen was found with one missing leg on the left side.

Family:
Oxyopidae

Figure 11.1-11.2: Unidentified *Oxyopid* sp. also known as a lynx spider. Defining characteristics are the long, thin abdomen and prominent bristles on the legs. Also note the enlarged chelicerae which is a common trait of the lynx spiders.

Family:
Pholcidae

Figure 12.1-12.2: A *Physocyclus globosis* which was discovered in the women's restroom at ATREC. This species was quite common within many buildings and could be found up in tight corners or along unreachable ceilings. It can be distinguished by its long, slender legs compared to the size of the body.

Family:
Saliticidae

Figure 13: Believed to be *Habronattus borealis*, a common jumping spider on the island. All spiders in this family are known for their acute vision and very active nature. This specimen was found on the Massacre trail at ATREC and was sitting on a tree. This spider was known to be a male because of the distinct, white pedipalps.

Figure 14.1-14.2: Unidentified *Salticid* sp. that was swept from the grass at ATREC. This spider is a known female because it lacks the large pedipalps of the male.

Figure 15.1-15.2: Yet another unidentified female *Salticid* sp. This spider was particularly intriguing because of its dark, metallic green head which is difficult to see because of the alcohol.

Family:
Selenopidae

Figure 16.1-16.2: A flat, slender body is a trait that belongs to this unidentified *Selenopid* sp. This particular spider was found at Middleham Falls under the

rotting bark of a fallen tree. The slender body allows for the spider to fit in crevices, such as tree buttresses.

Figure 17.1-17.2: Similar to the spider in **Figure 16.1-16.2**, this *Selenopid* sp. also shares the same flat body type. This female spider was found on the ground near stinking hole on the trail to Middleham Falls. Also note the eye pattern in

this family of spiders which is all in a row, contrary to the eye patterns of most other families of spiders with two rows.

Family:
Sparassidae

Figure 18.1-18.2: This giant male *Sparassid* sp. was found wander along the ceiling in the ATREC building. This family of spiders doesn't make a web. Instead it prefers to forage for food.

Family:
Tetragnathidae

Figure 19: female *Alcimosphemus licinus.* This particular picture is not of the specific spider I found, but it was borrowed from a previous student's project on habitats of spiders (6, Ward). The bright orange coloration and contrasting black on the sides of the abdomen are what distinguish this species from other Tetragnathids. This species was quite common up in the thicker parts of the forest right next to ATREC.

Figure 20.1-20.2: Large female *Leucauge venusta* which was swept at Boiling Lake. These spiders were very common in the in sulfuric areas. It can be recognized by its silvery metallic abdomen and two bright orange spots on the underside of the abdomen.

Figure 21.1-21.2: Immature *Leucauge venusta* which was swept at the same time as the female in **Figure 20.1-20.2.** In this picture you can clearly see the bright orange spots on the underside that distinguish the species. However the metallic coloration has faded in the alcohol.

Figure 22: female *Tetragnatha elongata* which was collected down at the Check Hall River at ATREC. This species of spider is on of the most common on the island and is found along the banks of freshwater pools and rivers. Its web is places over the water and many times more that one spider can be spotted in the same web.

Figure 23: Above is a male *Tetragnatha elongate* found in the same web as the female depicted above. These spiders come in a variety of colors from mottled grey to bright orange, such as this male. Also, the male can be recognized by enlarged chelicerae and pedipalps.

Figure 24.1-24.2: Immature *Tetragnatha elongata* also found down at the Check Hall River. Although smaller in size the large chelicerae, mottled coloration and long body give it away it as being a Tetragnathid.

Family:
Theridiidae

Figure 25.1-25.2: female *Theridion frondeum* found on a tree at Bee House at ATREC. This spider, similar to the unidentified *Araneus* sp., creates a funnel-like hide away to which it retreats when disturbed.

Discussion

Overall, the collection of the spiders for this project was based much more on chance than on precise technique due to the wide variety of habitats preferences and limited effectiveness of insect traps. Complications to trapping included the rain showers that that compromised the efficiency of the pitfall traps that were buried in ground matter during the downpour and the cup then filled with water. Because of this, there is a certain amount ,of error in the project where the pitfalls would have collected various species of ground dwelling spiders but failed to do so and thus, they were excluded from the field guide altogether.

The short three weeks we stayed at ATREC could also contribute quite a bit of error seeing how the majority of the collections were based on the chance of seeing the spiders in the area. Had there been more time allowed for collection there may have been a significant increase in the number of specimens that were seen and gathered. I would also like to note that on more than one occasion I was unable to outwit the specimen in the field in order to capture it even with an aspirator and they escaped and were not recorded or photographed.

Further studies on the species of spiders in Dominica may yield even more species of spiders that were not spotted or collected for this project. Another suggestion for future interest would be to spend more time in the different types of forest on the island that were less thoroughly searched on this trip. Due to the large number of students and lack of transportation I was unable to travel to those areas which are more suitable to arachnids, such as the dry and Elvin forests, and resultantly this project was likely compromised.

Acknowledgments

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