

An Initial Survey of the Heteropteran and Auchenorrhynchan Fauna of ATREC and
Surrounding Areas

Brendon Morris

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Texas A&M University

Dr. Thomas Locker

Dr. Jim Woolley

Abstract

This study aimed to survey the Auchenorrhynchan and Heteropteran fauna of areas within and around the Archbold Tropical Research and Education Center Dominica, WI. Several different techniques were used to collect the specimens and all individuals were identified to at least family level. It is imperative that more collecting be done in the future in order to fully grasp the hemipteran fauna of Dominica.

Introduction

The order Hemiptera encompasses a group of insects that are often plant feeding in nature. This study was focused on surveying two suborders within the order, Heteroptera and Auchenorrhyncha. The suborder Heteroptera includes several families and can be identified by the origination of the beak, from the front of the head; another characteristic typical of this suborder is the presence of the hemelytron. The second suborder surveyed in this study, the Auchenorrhynchans, can be distinguished by the beak origination from the back of the head; this suborder also does not have the partially thickened forewings as found in Heteroptera (Triplehorn and Johnson, 2005). This study a total of 182 insects were collected and identified in this study.

Materials and Methods

I used several different tools and methods to collect the insects, including Malaise traps, a beat sheet, a sweep net, pan trapping, and light trapping. I will not discuss the insects collected in the malaise traps here; only insects collected via pan traps, sweeping, beating and light traps will be discussed. The sweeping technique most often used was a

downward swing; however, an upward swing was used for any shrubs that were particularly tall. An aspirator was used to remove the insects from the sweep net. Aspirated insects were then stored in ethyl alcohol, or, if more fragile, dispatched in a killing vial charged with ethyl acetate. All of the light traps were assembled on and around the veranda of the station. The two lighting events that occurred off of the veranda were situated along the trail to the Check Hall river, and another was set before the bridge over a small tributarial stream running adjacent to the station. The beat sheet was used in instances where a sweep net would not reach well enough or would not provide enough force. The sheet was placed below the target branch and immense force was used to knock the unsuspecting insects into the reservoir below. All of the insects were identified to family level except for the family Membracidae, which were identified to genus. The remaining families were sorted into morphogroups using gross morphological features. Everything was stored in ethyl alcohol except for the family Miridae, which were killed using vials charged with ethyl acetate and point mounted. The light trap consisted of a horizontal rope with a flat white sheet attached by clothespins. The bottom corners of the sheet were then either tied to secure them or duct taped to support pillars. The mercury vapor bulb was then hung over the rope and secured using a clothespin. The light traps were turned on between 2030 and 2100; the traps were turned off and dismantled between 2330 and 0200, depending on the success. All insects were sorted using pointed forceps for manipulation. The insects were identified by placing into a petri dish with a layer of 95% ethyl alcohol. All insects were identified using the family level keys present in "Borror and DeLong's Introduction to the Insects" 7th edition by Charles Triplehorn and Norman Johnson.

Results

Several families were identified within the suborders Heteroptera and Auchenorrhyncha, seventeen total. The heteropteran families included Dipsocoridae, Veliidae, Gerridae, Reduviidae, Miridae, Pentatomidae, Berytidae, Lygaeidae, Coreidae and Rhopalidae. One individual was collected belonging to the family Dipsocoridae at a light trap. Five individuals belonging to the family Veliidae were collected along the margin of the Check Hall river using a hand net, defined as hand collecting in the table. One individual belonging to the family Gerridae was collected using a hand net along a margin of the Check Hall river as well. A sweep net was used to collect the seven reduviids, three of these belonged to morphogroup Reduviidae-a, these bugs were large bodied and had a red and black coloration. The second morphogroup was large bodied as well however the coloration consisted of a base light pink and darker pink longitudinal striping; there were four of these and they made up Reduviidae-b. The mirids collected formed two morphogroups, one being Miridae-a, which were small and black bodied, six insects made up this group. The second morphogroup consisted of four individuals, Miridae-b, these insects were larger bodied and light brown. Three different morphogroups made up the family Pentatomidae. Pentatomidae-a consisted of three individuals, these were medium bodied and were green in color. The morphogroup Pentatomidae-b were the smallest found and dark colored. They were only collected while sweeping around ATREC, two were collected along the trail to Middleham Falls, N 15°20'32.3"; W061°21'47.6". The trail to Middleham Falls was secondary disturbed rainforest, however after reaching Cochrane the vegetation gradually became primary rainforest, none of the insects included in the survey were collected here. The last morphogroup,

Pentatomidae-c was hand collected at Batalie Beach , N 15°34' 18.56" W 61°27' 15.20".

One berytid was collected using the pan trap method. Lygaeids were one of the most common families, this family was divided into three morphogroups. The first and most common morphogroup consisted of thirty-six individuals, twenty-five of which were collected at a light trap, the other eleven were collected by sweeping. These individuals had a light brown coloration. The second morphogroup consisted of bugs that had an enlarged fore femur and did not key out to the family Rhyparochromidae; this insect was collected at the light. The third morphogroup consisted of one individual that was black and red in coloration, this insect was collected at the light trap. Three coreids were collected, all at the light trap, only one morphogroup was defined as all three were the same size and a brown color. Two individuals belonging to the family Rhopalidae were collected at a light trap, these were defined as belonging to the same morphogroup. Two cicadas frequented the light trap, both were of the same morphogroup. The family Cercopidae were collected by both light trapping and sweeping. The first morphogroup was a stunning black insect with bright pink spots on its forewings, two individuals were collected. The second morphogroup was a smaller, brown hopper, one individual was found. The family Membracidae was collected on two separate events. The first collecting method used was beating, this was done on several occasions however only one specimen belonging to the genus *Monobelus* was identified. The second specimen was collected using a light trap and belonged to the genus *Micrutalis*. The family Cicadellidae was the most common family with 55 individuals collected. These specimens were collected using two methods, light trapping and sweep netting. Twenty-nine were collected at the light trapping events and sweeping yielded twenty-six

individuals. The delphacids were another common family and were present at both the light trapping and sweeping events. The highest yield was thirty-one individuals collected in one sweeping event. This sweeping was done in a patch of lemon grass. These individuals as well as four collected at a light trap composed Delphacidae-a and were a light yellow color, the other specimens were grouped into Delphacidae-b which were brown in color, there were three specimens. Another planthopper family surveyed was Cixiidae. These insects were collected by both sweeping and light trapping, they were divided into three morphogroups. The first morphogroup was collected while sweeping and consisted of three individuals, the second was collected while sweeping and consisted of only one specimen. The third morphogroup was collected at a lighting event and consisted of two individuals. The last family collected for the survey were the flatids. Only one specimen was collected at the light trap. This specimen was dark in coloration. All of the light traps, sweeping events and pan traps were set along the veranda of ATREC or adjacent regions, the central coordinates being N 15°20.794' ; W061°22.145'. The beating events occurred at N 15°20.795';W061°22.120'. All of the light trapping and beating events were within disturbed secondary rainforest on and around the station. All sweeping events were also on around the station unless designated otherwise.

Discussion

Hemiptera:Heteroptera

Gerridae

The Water Striders are a common family found on the water's surface, skating about searching for deposited insects to consume. Water Striders live along the margins of

aquatic systems and tend to lead gregarious lives. They move about using the middle and hind legs and feed with the first pair, an identifying feature of both veliids and gerrids is the ante-apical tarsal claws. The differentiating feature between gerrids and veliids is the leg attachment; the middle pair of legs in gerrids are placed much closer to the hind pair(293, Triplehorn and Johnson 2005). The specimen hand collected for this survey was found along the Checkhall River beneath a vegetative overhang .

Veliidae

Veliids are also common surface inhabiting insects, they feed upon diminutive insects and are often gregarious. They can be found in the same microhabitat as gerrids however they will also frequent riffle areas of streams(293, Triplehorn and Johnson 2005). The individuals hand collected for the survey were found along a margin of the Checkhall River.

Berytidae

Stilt bugs are primarily phytophagous and are often found in various vegetation types. They are easily identified by their elongated legs and antennae, and the absence of raptorial forelegs or an elongated head(298, Triplehorn and Johnson 2005). The specimen collected during the survey was collected in a pan trap, however it would be expected that extensive sweeping would yield them as well.

Reduviidae

The Assassin Bugs are fairly common predaceous bugs and are easily identifiable by their short, three segmented beak, which fits into a groove located on the prosternum

(296, Triplehorn and Johnson 2005). These were collected only while sweeping, and at least two morphogroups could be identified.

Lygaeidae

Seed bugs are a common group of insects and are easily identified by having all of the abdominal spiracles on the dorsal surface. They are phytophagous and often feed on plants that produce distasteful alkaloids(299, Triplehorn and Johnson 2005). The insects used in this survey were collected using light traps as well as sweep netting.

Coreidae

The Leaf-Footed Bugs are a notable group that are primarily phytophagous. They are identifiable by having a head that is narrower as well as shorter than the prothorax . Some species also have extended leaf like projections on their hind tibiae(301, Triplehorn and Johnson 2005). The specimens identified in this survey were collected using a light trap.

Rhopalidae

The Scentless Plant Bugs are smaller than coreids and do not have developed scent glands between the mid and hind coxae. Rhopalids are phytophagous and can often be found on herbaceous plants, however a few inhabit boreal habitats(301, Triplehorn and Johnson 2005). All of the specimens used in this survey were collected by sweep netting in grassy areas, *Cymbopogon* primarily.

Miridae

The Plant Bugs are a fairly common family, they are usually phytophagous; however predaceous species do exist. They are easily identifiable by the presence of a

cuneus(294, Triplehorn and Johnson, 2005). Ten specimens were collected and mounted in the survey and were defined in two morphogroups. They were collected at lights, however they are also common when sweeping.

Pentatomidae

This family includes the infamous Stink Bugs, they are largely phytophagous and often feed on grasses in the tropics. They can be identified by their round shape and five segmented antennae(303, Triplehorn and Johnson, 2005). Three morphogroups were identified in this survey, they were common at lights and while sweeping.

Dipsocoridae

The dipsocorids are typically found under stones near streams. They are not a common family and not much is understood regarding their placement in Hemiptera(289, Triplehorn and Johnson, 2005). One individual resembling a dipsocorid was collected at a light trap, the identification is not completely confident because a few of the key characters were not in the best shape upon collection.

Hemiptera: Auchenorrhyncha

Cicadidae

Cicadas are probably one of the easiest families to recognize; they are typically large bodied and have three ocelli. These insects also produce an audible sound unlike other Auchenorrhyncha which produce substrate based sound (305, Triplehorn and Johnson 2005). Two cicadas were collected in the survey; both in a light trap. Both cicadas were

included in one morphogroup. The cicadas collected were smaller than ones typically found in the United States.

Cicadellidae

The family Cicadellidae consists of the leafhoppers, a phytophagous group of insects. They are easily distinguished from related families such as Cercopidae by the rows of small spines that run the length of the hind tibiae(310, Triplehorn and Johnson, 2005) The leafhoppers were by far the most abundant family collected at lights as well as when sweeping.

Membracidae

The family Membracidae consists of the treehoppers; these insects are phytophagous and are largely known for the extravagant extension of the pronotum(306, Triplehorn and Johnson, 2005). Only two adult specimens were collected; one from a light trap and one from beating. The first specimen was identified as belonging to the genus *Monobelus* and the second belonging to *Micrutalis*. These insects were not by any means common.

Cercopidae

This family was collected sporadically between sweeping and light trapping. At least two morphogroups could be identified; one group was large bodied and the other much smaller bodied. This family includes the froghoppers, which are phytophagous. They can be distinguished from leafhoppers by the presence of a few stout spines on the hind tibiae(309, Triplehorn and Johnson, 2005).

Hemiptera: Fulgoroidea

The planthoppers can be differentiated from the leafhoppers and froghoppers by the placement of the antennae, which arise below the compound eyes. These insects also possess a carina, which separates the frontal portion of the head from the lateral portion; a carina is a sharp ridge (315, Triplehorn and Johnson 2005).

Delphacidae

This planthopper is easily recognized by a moveable, flattened, spurlike structure located at apex of the hind tibiae (315, Triplehorn and Johnson, 2005). These insects are very small compared to other plant hoppers. These insects were collected primarily via light trap; however, a few were also gathered using the sweeping method.

Cixiidae

This planthopper is largely phytophagous and recognizable by the rectangular abdominal tergites as opposed to chevron shaped tergites as found in Kinnaridae. These insects are also notable in having hyaline wings as well as often having a spot pattern along the wing veins (316, Triplehorn and Johnson 2005). Six specimens from this family were collected, and of these, three morphogroups were identified. Many others were sighted, although those specimens were not collected. This family is a fairly common planthopper in tropical regions (316, Triplehorn and Johnson 2005).

Flatidae

These planthoppers are easily identified by their typical wedge shaped appearance; however, they usually fully spread their wings when dispatched. The forewing typically has numerous costal crossveins, and this character tends to be a more reliable feature in

identification. They have phytophagous habits and often inhabit heavily wooded locals (317, Triplehorn and Johnson 2005).

The hemipteran fauna of Dominica seems to be very diverse, however much more collecting needs to be done in order to fully estimate the diversity. Several types of trapping should be engaged for longer periods of time. Table 1

Family	Morphogroup	MV Light	Sweeping	Pan trap	Beat Sheet	Hand Collect
Dipsocoridae	a	1				
Veliidae	a					5
Gerridae	a					1
Reduviidae	a		3			
	b		4			
Miridae	a	6				
	b	4				
Pentatomidae	a	3				
	b		3			
	c					1
Berytidae	a			1		
Lygaeidae	a	25	11			
	b	1				
	c	1				
Coreidae	a	3				
Rhopalidae	a		2			
Cicadidae	a	2				
Cercopidae	a	2				
	b		1			
Membracidae	Monobelus				1	
	Micrutalis	1				
Cicadellidae		29	26			
Delphacidae	a	4	31			
	b	3				
Cixiidae	a		3			
	b		1			
	c	2				
Flatidae	a	1				

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Works Cited

Ramos, J.A. 1957. A review of the Auchenorrhynchous Homoptera of Puerto Rico. *The Journal of Agriculture of the University of Puerto Rico*. Rio Piedras 41: 38-117

Triplehorn C.A. and N.F. Johnson. 2005. Borror and DeLong’s Introduction to the Study of Insects. Thomson Brooks/Cole. USA: Belmont,CA