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## Systematics

### A Survey of Fulgoroid Planthoppers (Hemiptera) on Dominica, WI

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#### Abstract

Fulgoroid planthoppers (Hemiptera: Fulgoroidea) are common plant-feeding insects. Although the planthopper fauna of Dominica, West Indies, has been studied and is fairly well-known, this study was conducted in hopes of building on the previous work. Planthoppers were collected daily from 23 May 2006 to 12 June 2006 using a variety of techniques and then sorted into morphogroups. These were then identified to lowest possible taxonomic unit. In the future we hope to identify all specimens to species and incorporate planthoppers collected in malaise traps which were also run during this time period.

**Keywords:** Fulgoroidea, Dominica, West Indies, Planthoppers

Planthoppers (Hemiptera: Fulgoroidea) are small phytophagous insects found worldwide in nearly all possible habitat types, and are extremely diverse in the tropics. There have been some studies done on Dominican planthoppers (Fennah 1942a, 1942b, 1955) so this study hopes to provide additional collection data and records of fulgoroids found on the island.

This study aims to identify the planthoppers found on the island particularly around the Archbold Tropical Research and Education Center (ATREC), Springfield (15°20'33.9"N 61°22'41.4"W). Other areas were sampled using passive techniques, but this data will be presented in a separate paper.

Planthoppers are in the suborder Auchenorrhyncha and are closely related to other hoppers such as Membracids, Cercopids, and Cicadellids. All are phytophagous using piercing-sucking mouthparts to feed on plant sap. Planthoppers are of little economic importance as very few cause damage to cultivated plants although one family, Delphacidae, has been found to be of economic importance in some instances. Fulgoroids are separated from other Hemiptera by the head morphology. The main uniting character is that the antennae are separated from the front of the head by a vertical carina and therefore appearing to originate beneath the eyes (Triplehorn and Johnson 2005). Often, the area in front of the eyes is greatly enlarged and usually snoutlike. This paper aims to survey the planthopper fauna of Dominica along with present key characters for the insects collected.

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## Materials and Methods

Insects were collected using a variety of methods including light sheets, hand collecting, vegetation sweeping, pan traps and malaise trap sampling. Insects collected with pan traps and malaise traps will not be discussed in this paper.

We ran a 9'x9' white sheet suspended from a large net pole frame with a 5'x8' ground cloth. The vertical sheet was lighted by two 450 watt EYE self-ballasted mercury vapor lamps (one on each side) run off of the building's 220 volt AC outlets. The sheet was set up in two different locations on the Archbold Tropical Research and Education Center (ATREC). The first location (15°20'55"N 61°22'04"W) was used from 24 May 2006 to 27 May 2006 and again from 31 May 2006 – 11 June 2006. This location was an east to west grassy slope with good exposure to the south. It was near thick vegetation surrounded by many tropical trees including star fruit (*Averrhoa carambola*) and royal palm (*Roystonea* sp.). The second location (15°20'54"N 61°22'04"W) was used from 28 May 2006- 29 May 2006. This location was on a flat terraced area and also faced east west with good exposure to the west. It was in a relatively open area with little vegetation in the immediate vicinity. The lights were turned on between 1850 hours and 1945 hours and left on until about 2330. Insects were collected into 50ml vials charged with ethyl acetate (C<sub>4</sub>H<sub>8</sub>O<sub>2</sub>). A special vial, known as the "hopper catcher" was used to collect the hoppers at light. A hopper catcher was a modified 50cc vial that had a 11/16 hole drilled through the cap and was fitted with an elbowed 15cc vial with a screw top. Insects jumped in the narrow part, hit the elbow and fell into the large vial.

This method works well for catching small jumping insects such as Fulgoroidea. Insects were collected by hand when they were observed perched or feeding on plants. This method was used primarily on hikes and only resulted in a few specimens.

The third method was sweeping vegetation. This was done primarily with a bioquip 18 inch aerial net (BioQuip product 7328NA). The net was swung through vegetation and insects accumulated in the net bag. After sweeping for period of time insects were removed and killed in ethyl acetate. A modified method was used to sweep trees where instead of sweeping side to side an upswing was used.

After insects were killed they were pinned, labeled, and sorted into morphogroups based on overall appearance and tarsal characteristics. These morphogroups were then identified to the lowest possible taxonomic unit using various keys (Dietrich 2005, Kramer, 1964, Kramer 1965, Triplehorn and Johnson 2005).

## Results

A total of 105 individuals were mounted. These belonged to 5 families: Delphacidae, Cixiidae, Tropiduchidae, Kinnaridae, and Issidae and were divided into 30 morphogroups. A summary of the data is presented in Table 1.

### Delphacidae

This family can be easily separated from other Fulgoroidea by the presence of a movable spur on the apex of the hind tibia. It is also the largest family of planthoppers (Triplehorn and Johnson 2005).

There were 5 morphogroups of Delphacids, 3 of which could be

identified to species. *Saccharosydne saccharivora* was collected 3 times at MV light on 3 different collecting events. *Caenodelphax teapae* was collected both at light and sweeping along the Syndicate Trail. *Sogatella kolophon* was collected once, at light. Of the two unidentified species one was collected at light and the other was only swept in the elfin forest.

#### Cixiidae

Cixiids are widely distributed although most are tropical. Wings are hyaline and typically spotted. They have abdominal terga that are rectangular in shape (Triplehorn and Johnson 2005).

A total of 52 individuals in this family were collected which were divisible into 17 morphogroups. The first was identified as *Cubana haruspex*, was collected at light. The next species, *Bothriocena daedalis*, was collected sweeping at Syndicate and in elfin forest. The 3<sup>rd</sup> species, *Bothriocena eborea*, was collected at light and swept in the elfin forest. Many members of the genus *Bothriocena* were collected mainly from the elfin forest and one was collected at light.

There were 12 morphogroups which were not identified. Of these, 7 were collected only in the elfin forest. Of the remaining 5, 4 were collected only at light at the ATREC and 1 was collected in both places.

#### Tropididuchidae

This is a tropical group with front legs that are longer than the abdomen. They have a series of crossveins between the costal margin and the apex of the clavus. They are slender and tend to be green, yellow, or brown (Triplehorn and Johnson).

There were 3 morphogroups of Tropididuchids collected and all were able to be identified to species. The first, *Tangidia fugax*, was collected once sweeping at Syndicate. The second, *Tangidia dominica*, was collected once at Syndicate and once at light at ATREC. The last species collected, *Neotangia caribea*, was only collected at ATREC.

#### Kinnaridae

This family is similar to Cixiids but smaller and lacks spots on the wings. The abdominal terga are chevron shaped (Triplehorn and Johnson).

There were 2 morphogroups of this family collected, both of which could be identified to species. The first collected was *Quilesta gladiolata* and the second *Quilesta maculata*, both were collected only in the elfin forest where they appear to be quite common.

#### Issidae

This family tends to be darkly colored and the hind tibia have spines laterally and at the apex (Triplehorn and Johnson).

There were 2 morphospecies collected and both were able to be identified to species. The first, *Colpoptera maculifrons*, was collected at ATREC. The second species, *Thionla medusa*, was collected by sweeping both at Syndicate and in the Elfin Forest.

#### Discussion

Delphacids tended to be collected at light around the station although a few were collected sweeping. One morphospecies was collected only in the elfin forest. The 3 species identified are all economically important, for example the sugarcane planthopper, *S. saccharivora*, is a pest of sugarcane.

Due to the fact that there are cultivated crops around the station, it is expected to find crop pests at ATREC, but not sweeping along trails in national parks.

There was a large variety in the Cixiids collected. However, many are represented by only one or two specimens. Many of these were only collected while sweeping in the elfin forest. It is unknown why such a high number were collected in this one habitat.

The Kinnarids were only collected in the elfin forest. Both were common while sweeping along the trails. These insects were first described from insects collected in the central part of the island off of low trees and ferns (Fennah 1945).

A small number of Tropiciduchids were collected, but they represented 3 of the 4 species that are known from the island. These insects were collected both at light on the station and also sweeping in Syndicate, but were not commonly collected. They are strictly tropical and feed on trees and shrubs.

There were 2 morphogroups of Issids collected on the island. Both were collected at light on the station. One was also collected while sweeping in the elfin forest.

## **Conclusion**

The Fulgariod planthopper population on Dominica appears to be

quite diverse. Cixiids are especially diverse and many could not be conclusively identified. Many of these were from the elfin forest, an area which has not been heavily collected before. Identification of these species could lead to new records or species for the island.

In the future we hope to continue identification of Fulgoroids especially those which are not species identified along with the specimens collected using passive techniques. This will most likely lead to an increase in species on the island due to many of these passive traps being in areas which have not been collected in the past.

## **Acknowledgements**

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Family	morphogroup	number of specimens	hand	Syndicate		
			collect (disturbed)	mv1 (disturbed)	mv2 (disturbed)	(Primary Rainforest)
Delphacidae	Saccharosydne saccharivora	3		3		
	Coenodelphax teapae	4		3		1
	Sogatella kolophon	1		1		
	1	7		7		
	2	2				2
Cixiidae	Cubana haruspex	6		5	1	
	Bothriocena daedalis	9				3 6
	Bothriocena eborea	3		1	1	1
	Bothriocena	11			1	10
	1	1			1	
	2	1		1		
	3	1				1
	4	9		4	5	
	5	1				1
	6	1		1		
	7	1				1
	8	4				4
	9	2		1		1
10	1				1	
11	1				1	
12	1				1	
Tropiduchidae	Targidia fugax	1				1
	Targidia dominica	2		1		1
	Neotangill caribea	2		2		
Kinnaridae	Quilesta gladiolata	6				6
	Quilesta maculata	24				24
Issidae	Colpoptera maculifrons	2			2	
	Thionla medusa	2				1 1

Table 1- Fuglorodis collected by family and morphogroup

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