Survey of Sphecidae on the Island of Dominica W.I.

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Abstract

A survey of Sphecidae was conducted on the island of Dominica from 29-V-2015 to 14-VI-2015 to determine which wasps were most common in the area. This survey resulted in the genus *Liris* appearing to be the most common in the surveyed areas, with *Liris fuliginosa* (Dalhbom) (Hymenoptera: Sphecidae), and *Liris labiata* (F.) (Hymenoptera: Sphecidae) being the main species found. Pan traps were more effective at collecting Sphecidae than malaise traps. It was expected to find other aculeate wasps besides Sphecidae, but samples showed no other families of aculeate wasps. Past studies have shown Pompilidae and Vespidae to be prevalent on the island. Researching why other families of aculeate wasps were not found could be the basis for future studies in Dominica.

Keywords. Sphecidae, Hymenoptera, *Liris labiata*, *Liris fuliginosa, Trypoxylon*

A survey of Sphecidae was conducted on the island of Dominica from 29-V-2015 to 14-VI-2015. Sphecidae is a family within the order Hymenoptera that contains mostly solitary wasps. Sphecidae can be separated from other families of wasps by the structure of their pronotum. In a lateral view of the pronotum a rounded lobe can be seen that does not reach the tegula, and in a dorsal view the posterior margin of the pronotum is straight with a constriction between it and the mesoscutum. Sphecidae are in the super-family Apoidea, which also contains bees, they can be distinguished from other families in Apoidea by different morphological traits. In Sphecidae all of the body hairs are simple and unbranched, the basal segment of the hind tarsus is not flattened, and the dorsal view of the pronotum is straight (Triplehorn 2005).

One of the most widely distributed wasps on island is in the genus *Liris.* On Dominica, *Liris* is represented by six species, which can be difficult to describe taxonomically (Evans 1972).

Sphecidae in the genus *Liris* make their nests in the soil with one to several cells and are mainly predators of crickets (Lazell 2005). *Liris fuliginosa* (Dalhbom) (Hymenoptera: Sphecidae), and *Liris labiata* (F.) (Hymenoptera: Sphecidae) were the two wasps within this genus that were found during the survey. *Liris fuliginosa* is widely distributed on the island and is generally larger in size than other *Liris* spp. Female *L. fuliginosa* can be separated from other species by the presence of a strong median basal ridge on the abdominal sternite II and numerous pale colored erect hairs on the head and mesosoma (Fig. 1). Male *L. fuliginosa* have brushes of setae on abdominal sternites IV-VI and a strong hump on abdominal sternite II (Evans 1972). *Liris labiata* is another common wasp on the island from the genus *Liris*, and is often found along the coastline or other sandy areas. Female *L. labiata* can be separated from other small *Liris* spp. by the presence of vibrant yellowish-brown wings, which are darkened apically (Fig. 1). Male *L. labiata* can be distinguished by having the same yellowish-brown wings as females, and also possessing a broad and curved emarginated process that is apically produced on abdominal sternite III.

The other wasps that were found are in the genus *Trypoxylon* (Fig. 3). Species in this genus commonly make their nests in the ground, natural cavities, or mud pipes made by the wasps. *Trypoxylon* sp. usually provision their nests with spiders. Sphecidae in the genus *Trypoxylon* have two distinctive characteristics that can help separate them from other genre: the presence of emarginate compound eyes and a clavate abdomen (Bugguide 2015).

Materials and Methods

Survey Procedure.

Samples were taken from 29-V-2015 to 14-VI-2015 using three different collection methods: sweep net, malaise traps, and pan traps. A sweep net was used primarily around the Archbold Tropical Research and Education Center (ATREC) to collect from low vegetation on the surrounding trails. Pan traps were set up each day in the butterfly garden and surrounding areas using yellow, blue, and white bowls filled with water and soap. The samples collected in the pan traps were filtered with a small net, rinsed with water to remove the soap residue, and preserved in 95% alcohol. Seven malaise traps were set up around the island of Dominica in different locations: Mount Joy, Checkhall River, Springfield Station Garden, Cabrits National Park, and the trail to Middleham Falls in Morne Trois Pitons National Park. The collected Sphecidae were all preserved in 95% alcohol, with the exception of 31 specimens being pinned or pointed mounted for identification. The Sphecidae were identified to species using the key within the 1972 Bredin-Archbold-Smithsonian Biological Survey of Dominica: Aculeate Wasps (Hymenoptera: Scoliodea, Vespoidea, Pompiloidea, Sphecoidea).

Collecting Localities.

1) DOMINICA: St. John Parish: Cabrits National Park, 2-VI-2015, sweep net, R. Callahan
2) DOMINICA: St. John Parish: Cabrits National Park, 15.587650°N, -61.472767°W, 2-8-VI-2015, malaise trap (MT), R. Callahan
3) DOMINICA: St. John Parish: Cabrits National Park, 15.587359°N, -61.472155°W, 68 m, 2-8-VI-2015, MT, R. Callahan
4) DOMINICA: St. Paul Parish: ATREC, Springfield, 29-V-2015, sweep net, R. Callahan
5) DOMINICA: St. Paul Parish: ATREC, Springfield, 1-VI-2015, sweep net, R. Callahan

6) DOMINICA: St. Paul Parish: ATREC, Springfield, 11-VI-2015, hand capture, R. Callahan

7) DOMINICA: St. Paul Parish: ATREC, Springfield, 3-VI-2015, at light, R. Callahan

8) DOMINICA: St. Paul Parish: ATREC, Springfield, 15.346558°N, -61.369010°W, 345 m, 1-13-VI-2015, MT, R. Callahan

9) DOMINICA: St. Paul Parish: Butterfly Garden, ATREC, Springfield, 15.346558°N, -61.369010°W, 345 m, 29-V-2015 to 14-VI-2015, pan traps, R. Callahan

10) DOMINICA: St. Paul Parish: Checkhall River, ATREC, Springfield, 15.3454833°N, -61.3691000°W, 330 m, 1-VI-2015, yellow pan trap (YPT), R. Callahan

11) DOMINICA: St. Paul Parish: Checkhall River, ATREC, Springfield, 15.3454833°N, -61.3691000°W, 330 m, 1-13-VI-2015, MT, R. Callahan

12) DOMINICA: St. Paul Parish: Mount Joy, ATREC, Springfield, 15.3477167°N, -61.3348500°W, 690 m, 29-V-2015 to 11-VI-2015, MT, R. Callahan

13) DOMINICA: St. Paul Parish: trail to Middleham Falls, Morne Trois Pitons National Park, 15.348421°N, -61.345659°W, 683 m, 31-V-2015 to 7-VI-2015, MT, R. Callahan

14) DOMINICA: St. Paul Parish: trail to Middleham Falls, Morne Trois Pitons National Park, 15.346703°N, -61.347716°W, 652 m, 31-V-2015 to 7-VI-2015, MT, R. Callahan

Figure 1. Dorsal, anterior, and lateral view of *Liris labiata.*

Results

A total of 78 *Liris fuliginosa*, 59 *Liris labiata*, and two *Trypoxylon* sp. were found during the duration of this survey (Table 1).

Table 1. The number of *Liris fuliginosa, Liris labiata,* and *Trypoxylon* sp. collected at each locality.

	Location (1)	**Location (4)**	**Location (5)**	**Location (6)**	**Location (7)**	**Location (8)**	**Location (9)**	**Location (10)**	**Location (13)**
Liris fuliginosa	0	2	3	0	1	1	71	0	8
Liris labiata	1	0	1	1	0	0	45	1	0
Trypoxylon sp.	0	1	0	0	0	0	1	0	0

Figure 2. Dorsal, anterior, and lateral view of *Liris fuliginosa*.

Figure 3. Dorsal, anterior, and lateral view of *Trypoxylon* sp.

Discussion

Based on the results of this survey, the genus *Liris* appears to be the most common on the island. *Liris fuliginosa* was collected the most out of the total number of specimens. This could be due to *L. fuliginosa* being widely distributed throughout various habitats on the island when compared to *L. labiata. Liris labiata* are more common in sandy areas or coastline, so it would be expected to find fewer than in the habitats of *L. fuliginosa*. Because the genus *Trypoxylon* is speciose, it is notable that few were collected during this survey. The use of malaise traps to collect specimens was not as effective as it was thought to be. This could be due to location of the malaise traps, weather, or set up of the traps. Based on the information gained during this survey, it appears that pan traps are more effective at collecting Sphecidae.

The initial survey was planned to be over aculeate wasps from Dominica, but only Sphecidae were found to be collected. Because of this the survey had to be made more specific for Sphecidae. It is unusual that no Vespidae or Pompilidae were found over the course of this study, since past surveys have shown them to be present on the island. Not finding other aculeate wasps could be due to the weather patterns this season or completion within the sampled habitat. For future surveys more pan traps could be used in a broader area and malaise traps could be placed in different locations.

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