

**Study of Thysanopteran Distribution Amongst Different Flower Species Around  
Springfield Research Station, Dominica**

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**Abstract.-** This experiment was conducted at a garden next to a housing facility in a field station on the Island of Dominica, West Indies. The Archbold Tropical Research and Education Center is regularly used for research teams from a group of universities. Specimens were collected from twelve flower species around the garden area with six flowers species not producing specimens. They were collected in the garden next to the housing facility from 3:00 p.m. to 4:30 p.m. This study focused on Thysanopteran families that were found on the flowers. The distribution was evenly distributed on most flowers but seven of the nineteen were not observed to have thrips. Three families were observed amongst the flowers in the order Thysanoptera. There were five flowers with large quantities of thrips while the rest had little to no specimens collected. The flowers in this survey were all identified to genus and most to species, while the Thysanopterans were identified only to family. The data from this survey can help Thysanoptera collectors determine which flowers to collect from to obtain specific families of thrips.

**Introduction.-** The order Thysanoptera consists of approximately 5,800 described species (Mound et. al 2009), with possibly many more un-described. The 5,800 species belong to two suborders; Terebrantia and Tubulifera as well as eight different families. Thrips are very small insects ranging from 0.5 mm to 13 mm with most having four reduced veined, fringed wings or absent wings (Triplehorn and et. al 2005). The mouthparts are unique amongst insects, and are described as punching mouthparts. The asymmetrical mouthparts are made up of three main stylets for feeding the left mandible and the maxillae, while the right mandible is vestigial or completely absent. In most thrips a downward or upward facing ovipositor is present while others lack this and possess tube-like reproductive organs. Thrips are hemimetabolous in which the nymphs do not differ in size as much but you can depict adults from nymphs/larvae. Most Thysanoptera are phytophagous feeding on flowers and plants. Of the phytophagous thrips most are found in tropical and temperate zones (Pinent and et. al, 2002), and lie in the family Thripidae. Other Thysanopteran are fungal feeders, and many are predators. A large number of species are considered major agricultural pest, with chances of transmitting plant diseases (Pinent and et. al, 2002).

**Materials and Methods.-** In this experiment, I used SC-Johnson Smart Zip Ziploc one gallon bags, 17 microscope slides, 17 circular cover glass, and vials. Slides were prepared using different solutions, applied in steps from potassium hydroxide to ethanol alcohol to Euparal, and used to make slide mounts to use under an American Optical One-Fifty compound microscope. The method used for collecting thrips was trimming a couple of inches below the flower and letting the flower drop in the Ziploc bags. Each

flower was in a separate bag to keep the thrips from escaping. Collecting began 5/25/2014 at 3:00 p.m. to 4:30 p.m.; flowers were selected based on appearance to be analyzed for thrips. The flowers selected were on the border of the primary forest and secondary forest in the housing facilities garden. The Thysanopterans were identified using a Leica EZ4 microscope. Each group of thrips from each bag was then placed in vials containing 95% ethanol, with the flower taped to the vial afterwards. The method of removing the thrips was dipping the flowers into ethanol alcohol and lightly shaking and spraying with a 500 mL VWR bottle. Once the separating was complete each vial was observed and thrips that seemed to be ideal for slide mounting were selected. The slide mounting was done using specific steps to obtain ideal specimens. They were first placed in a Corning thermoplastic multi-well test tray, treated with potassium hydroxide-overnight, then 35% Ethanol alcohol for 15 minutes, 50% Ethanol alcohol for 15 minutes, 75% Ethanol alcohol for 15 minutes, and finally 95% Ethanol alcohol-overnight. They were then mounted to slides and left in Euparal-overnight. After the thrips were set on the slides and dried for a day they were then observed using a compound microscope. Once the families were observed and classified each vial was then examined and thrips from them were I.D. and graphed, separated by flower species.

**Results.-** This experiment examined three families in the order Thysanoptera, which were 89% Thripidae, 3.4% Phlaeothripidae, 2.3% Merothripidae, and 4.9% unknown nymphs, out of 265 specimens examined. A thrips were collected on 12 different flower species among the 19 flowers collected around the housing facility, which were mostly ornamental, results of thrips found listed in Table 2. Thrips were selected from 8 of the

12 flowers containing thrips for slide mounting with results illustrated in Table 1. It was assumed that Thripidae would have the majority of the species collected on the flower species, which was the case. The total number of Thysanoptera collected is on each flower species is indicated in Figure 1. Figure 2 indicates the total number of each thrip family per each flower species collected from.

| <b>Thrips Slide-Mounted</b> | <b>Thysanopteran Families</b> |
|-----------------------------|-------------------------------|
| <b>001 F1</b>               | Thripidae                     |
| <b>002 F1</b>               | Thripidae                     |
| <b>003 F1</b>               | Thripidae                     |
| <b>004 F2</b>               | Thripidae                     |
| <b>005 F3</b>               | Phlaeothripidae               |
| <b>006 F3</b>               | Phlaeothripidae               |
| <b>007 F4</b>               | Thripidae                     |
| <b>008 F5</b>               | Merothripidae                 |
| <b>009 F5</b>               | Thripidae                     |
| <b>010 F5</b>               | Thripidae                     |
| <b>011 F6</b>               | Thripidae                     |
| <b>012 F7</b>               | Merothripidae                 |
| <b>013 F7</b>               | Thripidae                     |
| <b>014 F7</b>               | Thripidae                     |
| <b>015 F7</b>               | Thripidae                     |
| <b>016 F7</b>               | Thripidae                     |
| <b>017 F8</b>               | Thripidae                     |

**Table 1: Slide Mounts of Thysanoptera From 8 Flower Species.**

| Flower Species                 | Thripidae | Phlaeothripidae | Merothripidae | Nymph |
|--------------------------------|-----------|-----------------|---------------|-------|
| F1-Hibiscus species            | 70        | 0               | 2             | 1     |
| F2-Senna surattensis           | 1         | 1               | 0             | 1     |
| F3-Trimezia martinicensis      | 1         | 2               | 0             | 1     |
| F4-Tithonia diversifolia       | 35        | 4               | 0             | 2     |
| F5-Rosa species                | 28        | 0               | 1             | 1     |
| F6-Solanum torvum              | 10        | 0               | 0             | 0     |
| F7-Ixora species               | 38        | 1               | 3             | 7     |
| F8-Double Hibiscus             | 47        | 1               | 0             | 0     |
| F9-Cuphea hyssopifolia         | 1         | 0               | 0             | 0     |
| F10-Plumeria rubra             | 4         | 0               | 0             | 0     |
| F11-Russelia<br>equisetiformis | 1         | 0               | 0             | 0     |
| F12-Dissotis rotundifolia      | 1         | 0               | 0             | 0     |

Table 2: Number of Thrips via Family for Each Flower Species.

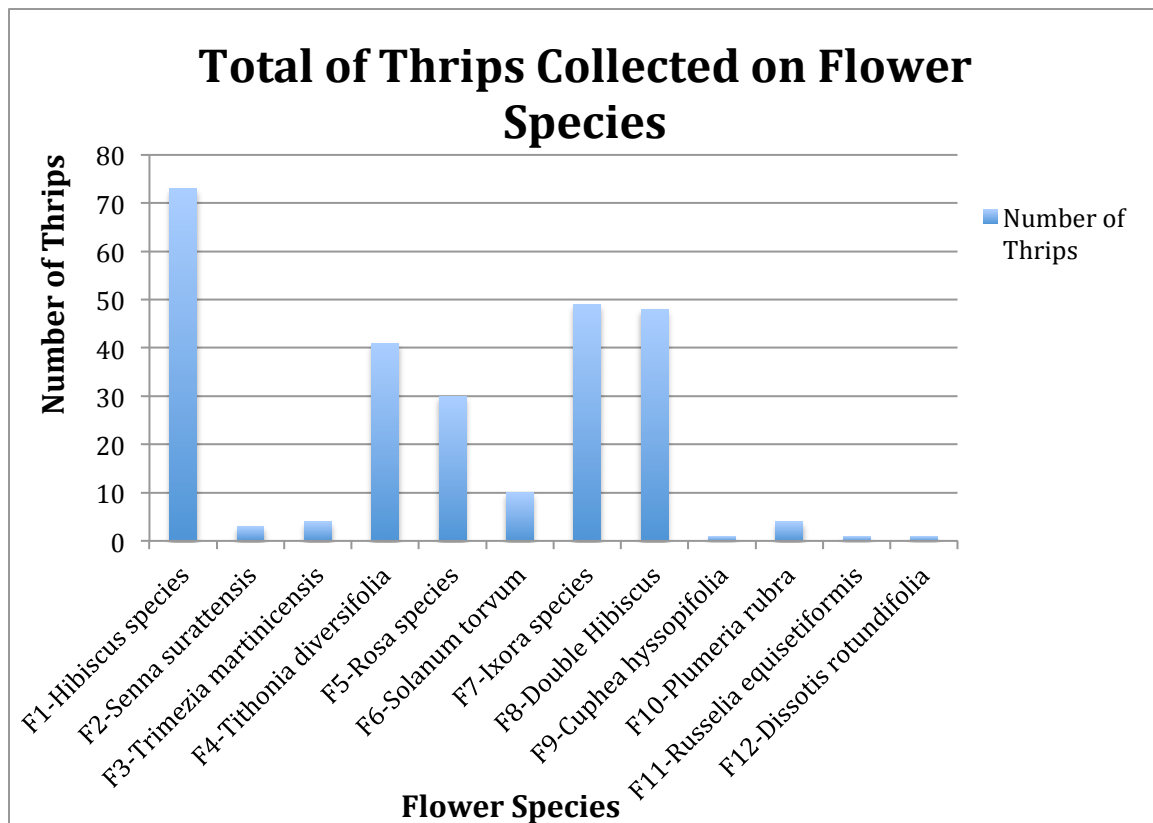
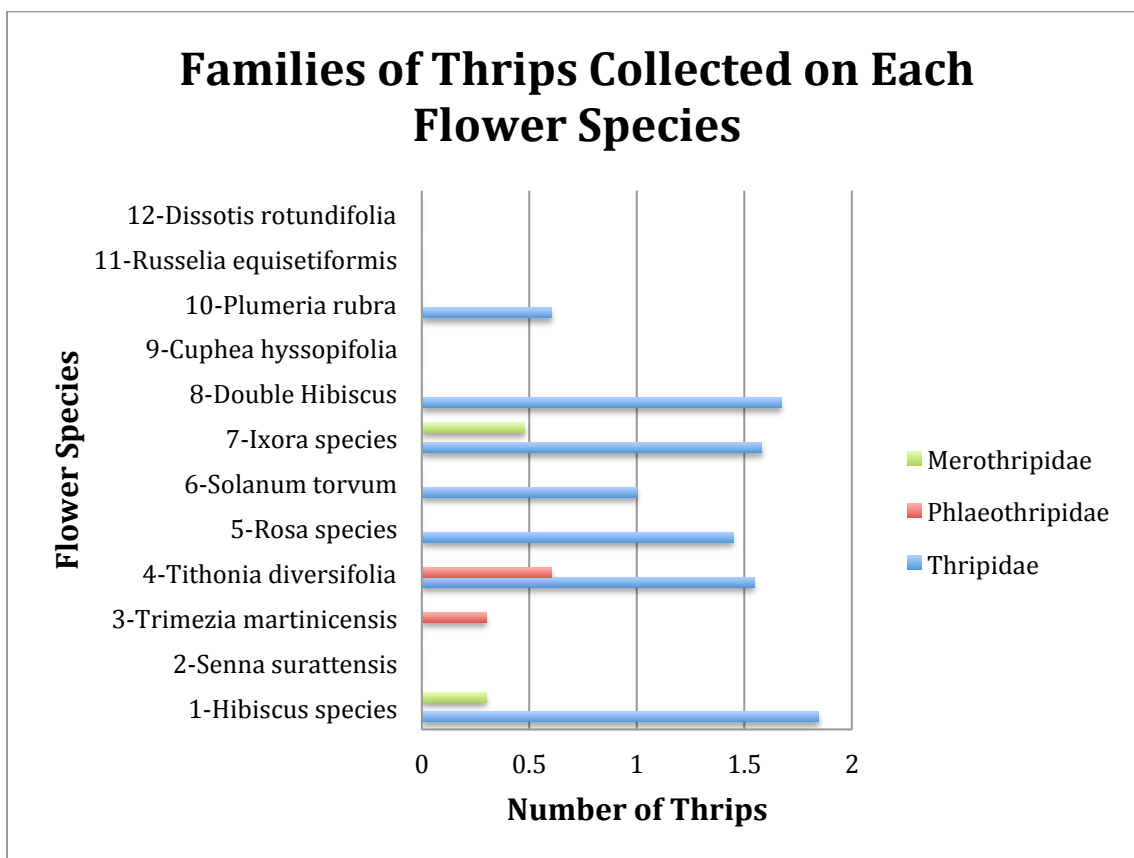


Figure 1: Total Number of Thysanoptera Collected on Each Flower Species.



**Graph 2: Thrips Families Collected on Each Separate Flower Species.**

**Discussion.-** There are many phytophagous insects that feed on angiosperms. Thrips have been studied and acknowledged as pollinators in a variety of angiosperms (Cloyd R. A., 2010). Of the 19 observed flower species 12 contained thrips. These flowers produced a strong fragrance, while the other 7 produced little to no outward fragrance. I am assuming the compounds the flower is releasing that smell fragrant to people could also be attracting Thysanopterans the same way. It seemed to be that the Hibiscus species, Rosa species, Ixora species, and Tithonia diversifolia attracted the most, which all have strong fragrances. Flowers release compounds to attract insects to provide pollination to their species (Cloyd R. A., 2010). Color did not seem to be a factor in

determining Thysanoptera attraction, which has been used in previous studies that illustrate yellow as a color attraction (Hoddle and et. al, 2002). I believe Thripidae had the highest abundance amongst all the flowers collected due to them being primarily phytophagous. The Merothripidae and Phlaeothripidae are known to be mostly fungal feeders with very few phytophagous. It is possibly that these thrips could be feeding on decaying flowers or parts of the flowers as well. This study can help collectors and entomologists understand what thrips are feeding on flowers in certain locations in Dominica.

Taking more samples from the same flower species over multiple coordinating days could have made the study more efficient. Another approach would be to collect at different times during the day or collect from endemic plant species around the island. Thrips are a diverse group, which can be studied in multiple aspects and applications.

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