Comparison of Stephen's Light Trap against Malaise Traps.

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Dr. Robert Wharton
Dr. James Woolley

Written by: Stephen Ross

Abstract

This is a study to show the benefits of using my light trap over a conventional malaise trap. The study area was performed on the island of Dominica and lasted for approximately 13 days. Findings of the study showed that the light trap performed as well but not significantly better at capturing different orders of insects.

Introduction

One of the important jobs of an entomologist is to collect what they are studying. Many traps have been designed to help collect insects throughout the years such as malaise traps, flying traps, and pan traps. With each of these traps you use the behavior of the insect to most effectively catch them. The malaise trap which was invented by Rene Malaise in the 1930's (Wikipedia 2007) will be the focus of this study. One of the most apparent behaviors is flying towards a light source at night known as phototaxis. Many people use light traps for monitoring insect populations especially for commercial pests (Nair 2004). Through the use of this behavior I have developed a new trap to collect insects with the help of a light source. It is my belief that the trap will be more effective at collecting a more diverse group of insects than the malaise trap.

Study Area

The study area I chose was outside of the Bee House at the Tropical Research and Education Center Springield, Commonwealth of Dominica. This area minimized the amount of ambient light around the light trap. The malaise traps were set away from the light source but as close as possible to reduce habitat variation. The elevation was about 365 meters above sea level. The time period for the study lasted for 13 days.

Figure 1. Assembled light trap.

Materials

- ¾ “ PVC
- 5 yards Tulle netting
- 5 250ml bottles
- 5 laser cut Plexiglas covers
- 12 corner connectors
- 12 sleeve couplings
- 2 malaise traps
- 10 meters of rope
- 14lb. test fishing line
- Water
- 95% Ethanol
- 10 meter extension cord
- 220 volt safety light with self ballasting mercury vapor bulb

Figure 2. Constructed bottle

Methods

After assembling my light trap on May 27 I promptly set it up in the designated area with the bottles filled with 50% alcohol. The malaise traps were set up 10 meters and 30 meters away with 50% alcohol.

Figure 3. Trap at night.

The first night my trap was turned on at 6:00pm and jars put on the malaise traps. The light was turned off at 9:00am and the jars were removed. The insects were then placed into a 30x15 cm sorting tray and identified individually to order. The 2 malaise samples were combined to increase the sample. I took the numbers down to compile them later in an Excel sheet. The next night on June 2 I repeated the same procedure but

started trapping at 6:00pm and ran it to 6:00pm the next day. I sorted this sample by placing the insects in the tray again and randomly selecting a standard Petri disc size sample by pressing the disc down and emptying the rest of the sample. The samples were again processed and counted. The third night on June 8 I ran the traps again from 8:00pm to 6:45pm. The samples were taken again as on the second trial.

Results

The following results were compiled using Microsoft Excel. These graphs show the various compositions of the samples taken from the light trap and combined malaise trap samples. The light trap succeeded in capturing 1.65 times as many insects as the 2 malaise traps combined even after losing one jar due to a break on one night. The light trap also succeeded in maintaining the diversity of insects collected. Some orders such as Lepidoptera and Hemiptera showed more than 4 times the insects collected in the light trap over a single malaise trap.

Figure 3.

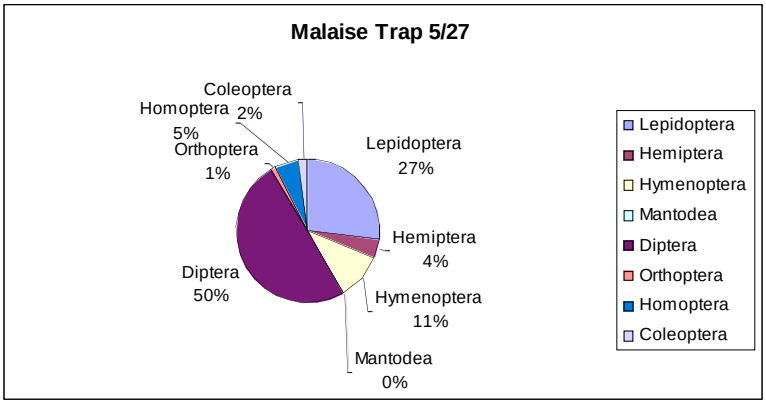


Figure 4. One jar fell during the night and was not counted.

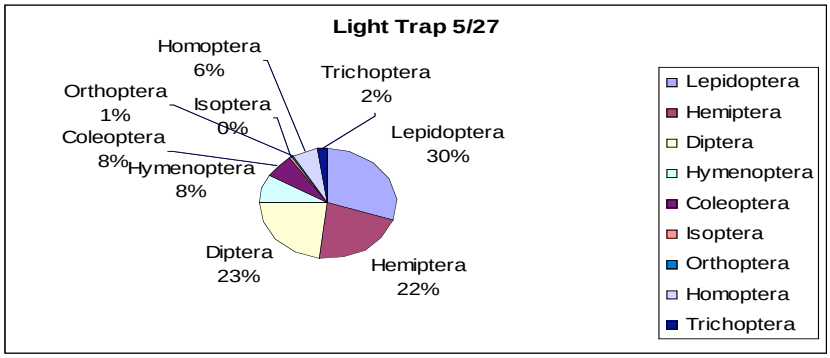


Figure 5.

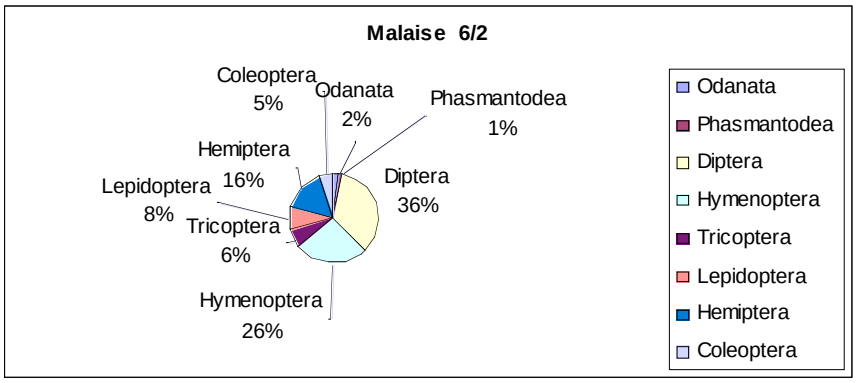


Figure 6.

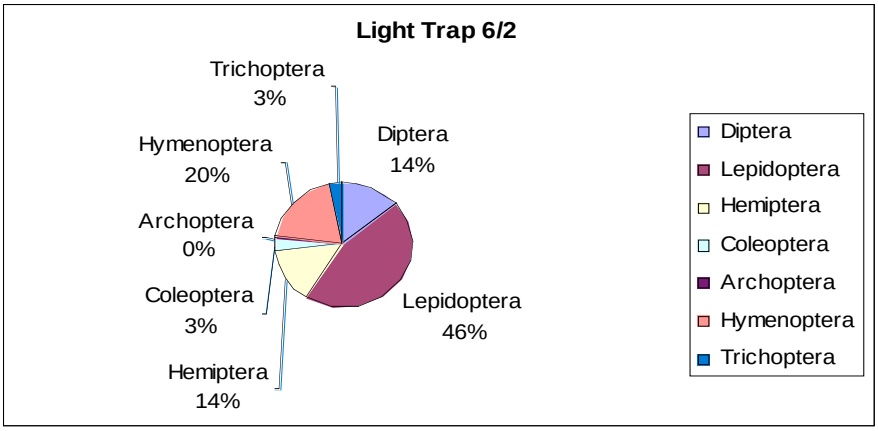
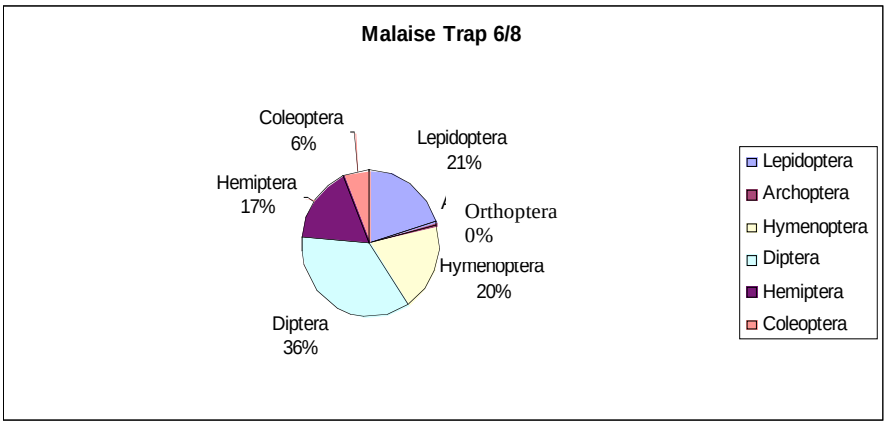


Figure 7.



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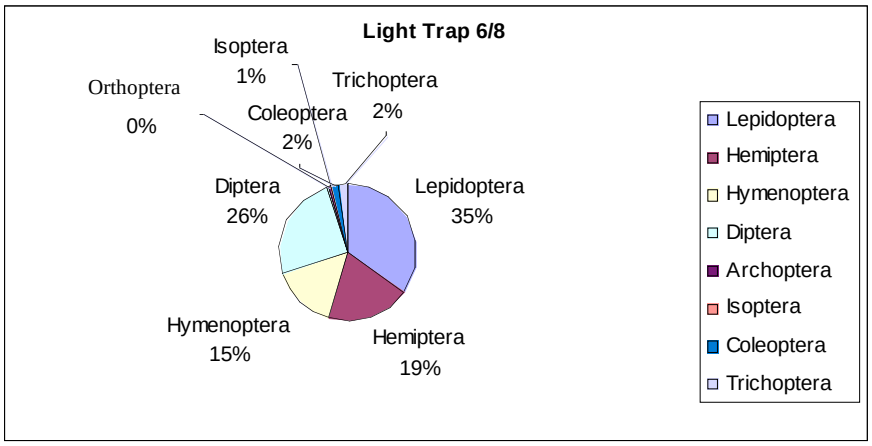

Figure 9.

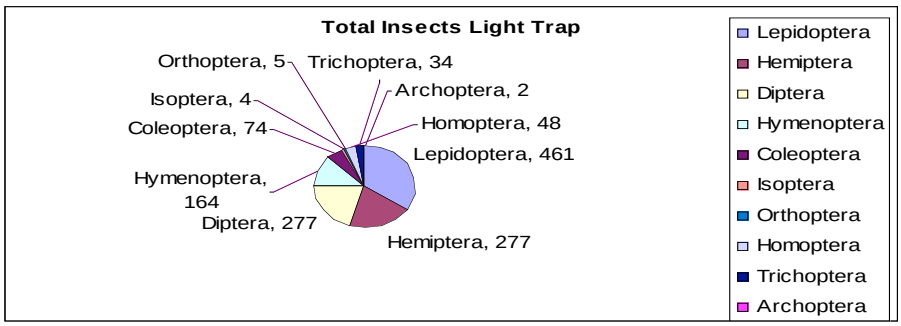

Figure 10.

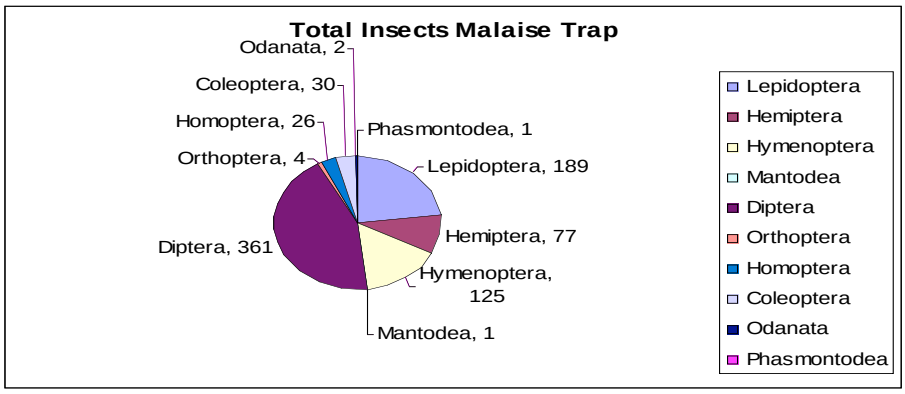

Figure 11. Total Insect Counts

Light Trap			Malaise	
Lepidoptera	461		Lepidoptera	189
Hemiptera	277		Hemiptera	77
Hymenoptera	164		Hymenoptera	125
Diptera	277		Diptera	361
Coleoptera	74		Coleoptera	30
Orthoptera	7		Orthoptera	4
Homoptera	48		Homoptera	26
Isoptera	4		Mantodea	1
Trichoptera	34		Odonata	2
			Phasmontodea	1
Total	1346		Total	816

Discussion

The study concludes that my hypothesis was not supported by my data. Although the trap caught more bugs the number of orders was not significantly more. The light trap caught approximately 2 times more insects in Lepidoptera and Hemiptera which show a strong selection and or bias for these orders. The light trap also collected two

different orders than the malaise trap which were Trichoptera and Isoptera. The amount of time the trap is collecting also has to be accounted for when looking at both traps. The light trap only collects insects during low light parts of the day while the malaise trap has an almost equal chance of collecting an insect throughout the day. A limiting factor in the trap was the size of the bottles. Bottles tended to fill up and insects escaped by walking on lepidopteron wings. This could easily be remedied by increasing the size of the jar or installing a new collection method. My trap was also originally supposed to run a set of black lights but due to electrical transformation issues I was unable to carry out this part of the experiment. Having black lights could have had a significant effect on the results of this experiment not only on the numbers but types of insects collected. This is evident from a study done in 1972 at the University of Kansas in which the insects varied according to white or black light use (Carlson 1972). The use of various lights could make this trap extremely valuable in getting the insects you want. It is also valuable in the sense it could also be baited with chemicals, pheromones or other attractants.

Works Cited

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3. Wikipedia. Rene Edmond Malaise. 10 June 2007. 31 January 2007. <http://en.wikipedia.org/wiki/Ren%C3%A9_Malaise>.

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